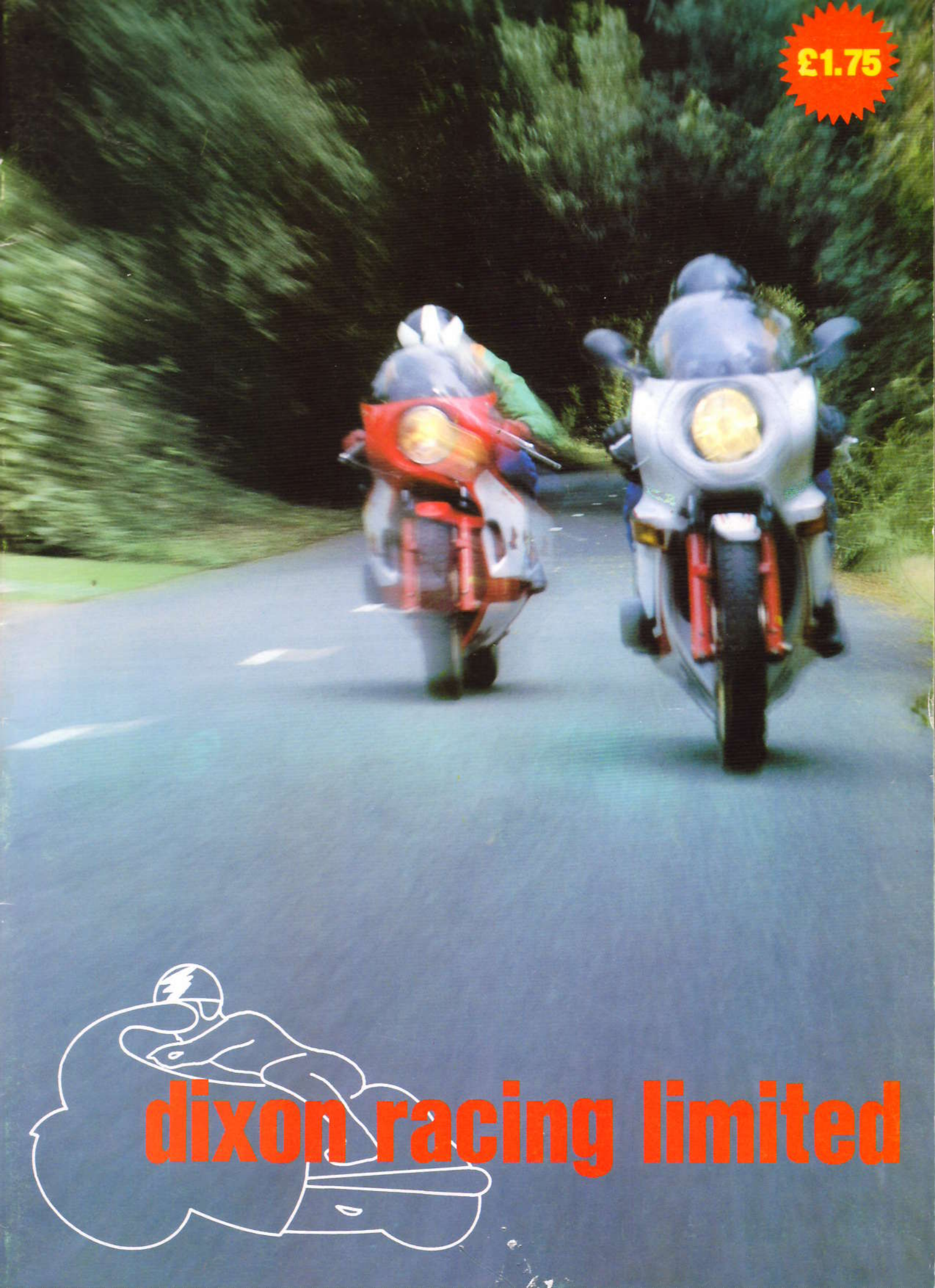

£1.75
dixon racing limited

CONTENTS

The original Company started in March 1971 as the Dixon-Robb racing school, my partner being Tommy Robb. The racing school operated very successfully throughout the United Kingdom and Europe. The ever-increasing demand, through the school, for Honda tuning parts led to my association with Yoshimura in 1973, but this business overwhelmed the school and it was sold in 1974. In December 1973, the present retail business started, incorporating a Honda motor cycle main agency alongside tuning and engine preparation.

Expansion necessitated the move to our existing premises in October 1977 where a full-time staff of eight, and three part-timers, are responsible for the despatch of tuning parts not only throughout the U.K. but Europe, Africa and the Far East. Workshop personnel are experienced service and race mechanics, having served their time not only on service courses, but also "burning the midnight oil" on the Isle of Man (and U.K. short circuits). All full-time staff members are active motorcyclists.

My own motorcycling started in 1951 in Ireland, where I competed successfully in trials, grasstracks, scrambles/motocross and hillclimbs. From 1958 to 1971 I was a staff journalist with "Motor Cycle" magazine testing road machines, trials, motocross, grasstrack, speedway and various sidecar outfits but specialising in road-race machinery. Many of these racers were factory bikes, including T.T. and World Championship-winning machines.

Experience as an active road racer from 1961, specialising in production-machine endurance races, including 119 miles in one hour at Monza on a Paul Dunstall-750 Norton in 1967, enables me to look on the practical problems of performance tuning. Since 1973, when I entered Bill Smith on the winning 500cc Honda in the Isle of Man Production machine T.T., Dixon Racing prepared and sponsored engines and machines have won trials, grasstracks (solo and sidecar), scrambles, short circuits, endurance races, drag/sprint events - and finished three times (out of four) in the top three in the Isle of Man. This wealth of practical experience is yours for the asking!

I hope you enjoy this, our first full-length tuning manual.

Ride safely!

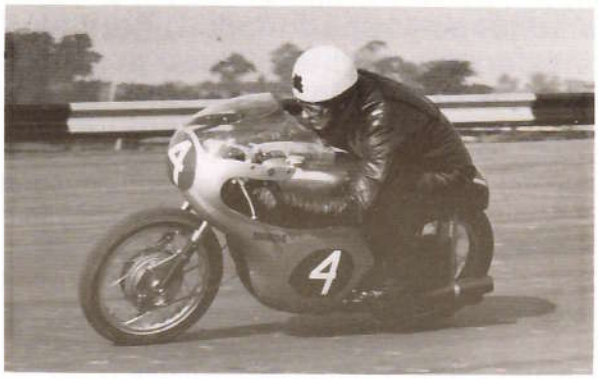
David Dixon

Photo by Vic Barnes

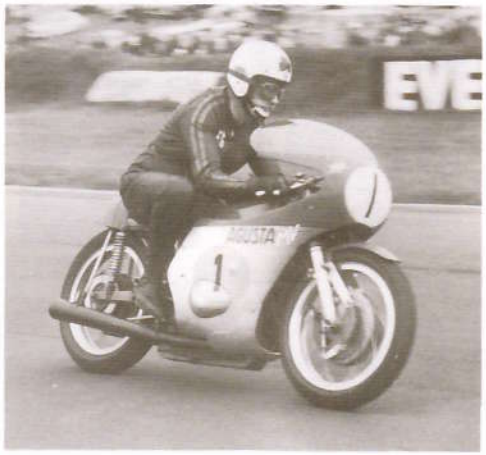
THE WORKERS! L - R (front) Colin Charles (foreman), Teri Ragless (personal assistant), Christine Dixon (company secretary), Susan Cooper (secretary), Paul Dilley (mechanic). Rear: Martin Matravers (manager), Derek Trawber (sales), David Dixon, Robin Johnson (Honda service).

A FEW OF THE BIKES TESTED OVER THE YEARS.....

1959: The first European journalist to ride Honda, David Dixon samples a 125cc 75mph twin in the Isle of Man.



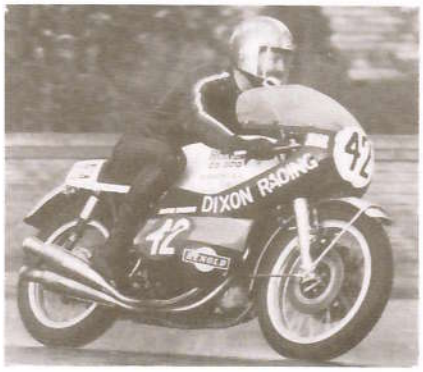
1962: The only journalist to ride a works Honda 250cc four, Dixon did 50 laps of Mallory Park on Derek Minter's TT - Winner.



1971: The only journalist to ride Agostini's 500cc MV, Dixon lapped Brands Hatch.

1965: This works production Velocette was shared with Joe Dunphy for a 500cc class win in the 500 Miler at Castle Combe.

. . . AND SOME OF THE RIDERS WE'VE SPONSORED



Right: Bill Pye has been sponsored by Dixon Racing since 1974 - winning over 400 races on his Hondas.
Left: Bill Smith winning the 1973 T.T. 500cc Production Class - first time Dixon entered I o M races.
Below: Grass tracker Jez Philips won lots of races on his Dixon-sponsored Kawasaki in 1977.
Left: First time out on his Honda, Charlie Williams was second in the 1979 F.I. Isle of Man T.T.

Our speciality is extracting extra performance - we start where the manufacturers stopped! Even the best of today's designs have to be a compromise, catering for a tremendously-varied market, not only in terms of rider needs but also geographical considerations. The finished product must therefore be a compromise in terms of materials, performace and road holding.

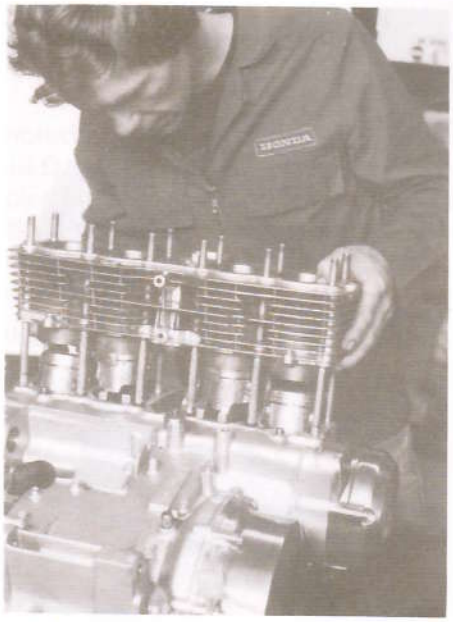
Most Japanese multi-cylinder designs are sufficiently lightly stressed and inbuilt safety margins allow ample scope for extracting extra performance without endangering reliability.

Different tuners have different approaches to achieve the same end; some swear by big-bore piston kits (increasing the capacity), whilst others claim that increasing the compression ratio is at the heart of the matter. We would not totally disagree with either view, but our experience has shown that the biggest single performance improvement results from using a camshaft giving greater lift, earlier opening, and later closing than that of a standard camshaft - even when used in conjunction with the standard (modified) pistons.

Biggest performance boost comes from using a Yoshimura cam and big bore kit - this is GSX 1100.

Obviously, the single greatest improvement results from a combination of both, i.e. a combination of camshaft and high-compression piston design, used in conjunction with a modified cylinder head and dyno-developed extracter exhaust system.

The over-riding factor is, of course, the customer's needs. Frequently we get requests along the lines of "I gotta have maximum power, wanta do 150-plus . . !" On enquiry, we usually find the customer is talking about an old 500 or 750-4 whose basic needs are for a damn good engine overhaul before even contemplating tuning! Reliability must always be the first consideration; if the engine has done a high mileage, with an unknown history, and you intend using it on normal roads, then the specific requirements are different from the customer who is intending to enter competitions. We can meet most requirements, but the first consideration is the engine's condition and what its work will be.



Fitting a CB900 big - bore kit after an overhaul - capacity out to 996cc

To cope with any power increase, the engine should be restored to as near 100% mechanical condition, to maintain reliability. Only then should extra performance be considered.

Installing a high-performance top half on a 50,000/70,000 miles bottom-end is inviting trouble! For starters, the cylinder head is bound to be warped and to need re-facing. Our labour charges for an engine stripdown and overhaul are no higher than any other reputable firm; we also guarantee our work. If you cannot get the engine to us, ensure that a reputable firm to whom the work is entrusted does the job properly before performance parts are fitted. What few conversion problems we have experienced were usually caused by (a) poor engine preparation, or (b) incorrect installation of the performance parts. Remember, "you'll get what you pay for"; the money you spend should entitle you to the performance which we offer and, whilst we appreciate everyone must work to a budget, we cannot emphasise too strongly that you carefully consider by whom, and how, your engine is to be modified. Work which we do, or parts which we supply, are covered by our three months parts/labour warranty (non-competition use).

How Power is Obtained

Extra performance is obtained by getting the mixture more quickly into the engine, compressing it harder to burn faster, and releasing the burnt mixture as rapidly and completely as possible. This is achieved by greater lift, i.e. pushing the valves farther into the cylinder, and by opening the inlet valve earlier and closing it later. Opening the exhaust valve earlier, and holding it open later (on the appropriate stroke) ensures maximum scavaging of the cylinder, i.e. clearing out the gas.

Raising the compression ratio achieves quicker burning of the mixture already in the cylinder, in conjunction with (possibly) advancing the ignition timing (i.e. sparking off combustion earlier) - depending upon the type of cam used. Ultra-high compression ratios used to be fashionable but there are severe limitations. Obviously, for certain competition uses, such as grasstrack, speedway and drag racing high compression ratios are necesary for slow-burning alcohol fuels. Ultra-high compression pistons usually achieved their object by means of an ultra-high crown, which was either domed or wedge shape. This not only decreased cylinder-filling efficiency, but also hindered flame travel for the escaping exhaust gases.

Compare the standard CB900 piston (left) with the high - comp 996cc one on right.

For the purpose we are now examining, we assume you are using a petrol engine for normal road use, in which case the prime consideration is getting the mixture in and out of the cylinder most effectively. So a compromise is the best solution, a piston giving a higher-than-standard compression ratio but with a flattish crown to facilitate cylinder filling and a quick exit of the burnt exhaust gases. With the disappearance of 100 octane petrol (five star) no practical advantage for normal road use can any longer be obtained by running higher than, say, 10 to 1 (on average).

The most desirable road-use characteristic is a camshaft/piston set up which gives not only increased bottom and mid-range power but a useful bonus at the top end. Getting from A to B more rapidly is of more practical advantage rather than sheer top speed (which is usually well over the legal limits and therefore of academic interest). However, if it is middle and top-end power that you require, for racing, it is essential to understand the stresses which may be imposed upon other components. These components must either be replaced or strengthened if reliability is to be maintained. And, for maximum performance, if you cannot afford high compression pistons then you must use standard modified, because the greater camshaft lift and overlap will cause valves to hit the standard (unmodified) pistons.

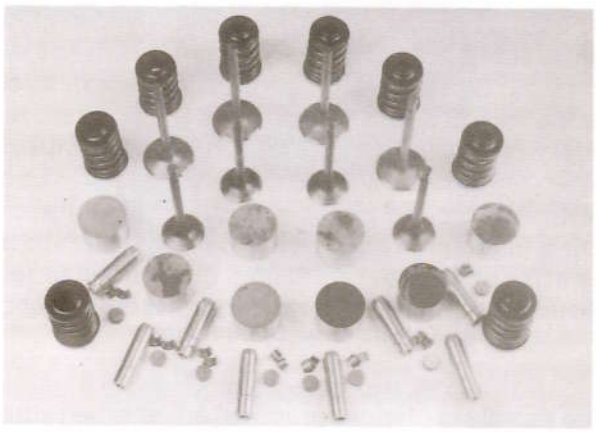
Getting from A to B more rapidly ..... was the aim of Alex Heal's turbo Dixon Honda.

Using a race valve spring kit will ensure that the valve operating gear keeps in contact with the valves at high r.p.m., thus effectively eliminating "valve float." This "float" is the result of weak or poorly-designed springs not returning the valves to their seats at high r.p.m. The symptom is a loss of power accompanied by a light "tinkling" noise from under the tank (usually when the r.p.m. needle is well into, or beyond, the red zone on the dial).

A race valve spring kit is essential to keep valves under control at high r.p.m.

How power is obtained

Talking of valves; there is a fallacy that installing big valves produces big power. Under the correct circumstances they do, such as when used with a full-race specification. Big valves are unnecessary for road use and, as such, are likely to be a disadvantage because the power produced by bigger valves is mainly from the middle to top end of the range.

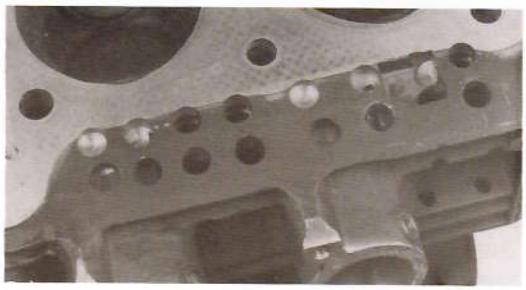


This Yoshimura lightweight valve gear kit is intended for racing, the 40% reduction in weight and the big valves, greatly improve acceleration when used in conjunction with full-race camshafts - but the kit is not intended to be used with stock cams.

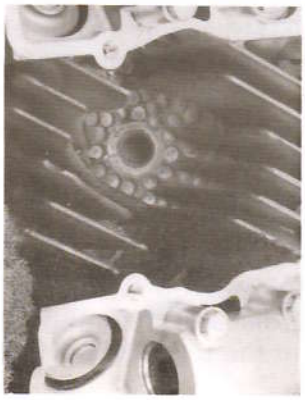
Another popular misconception is that when an engine has been tuned the crankshaft should also be lightened, polished, and rebalanced. Certainly, if it has been lightened and polished, then it will need rebalancing - but neither are desirable nor necessary for road use. Even on our Formula One race engines, we use standard unmodified, unpolished and *not* welded-up crankshafts (which is another fallacy!). Only if one is scratching for the last fraction of b.h.p. is it worth considering polishing the crankshaft, and only then in a wet-sump engine. A polished crank could effectively reduce oil-drag in a wet-sump crankcase and a lightened crank will aid acceleration but it will also reduce torque (bottom-end power) and will detract from slow-speed riding, such as in town, etc. The only justification for spot-welding a crank (to stop it twisting) is in drag racing - or if the design is inherently weak.

When planning to improve an engine, it is more beneficial to think in terms of improved breathing efficiency. For instance, having obtained a high performance camshaft, make certain it is correctly installed, i.e. if there are instructions for degreeing it in, then set it up on the standard marks and check the timing figures are correct. If the ignition timing has to be advanced, make certain it is. (Not all cams need the ignition advanced, but performance can generally be improved with some ignition advance).

Stage 3 Suzuki "works" race cams are hollow, have lightened sprockets and bosses to reduced weight.



Above: To lose much of the tremendous heat generated in the works engines, Pops bores holes around head to increase air flow. Below: He even puts indents into top of head castings to dissipate heat!



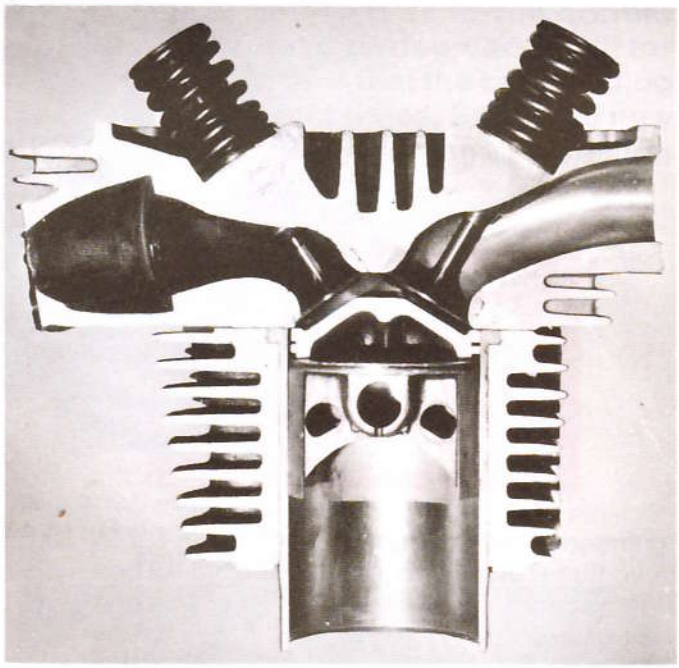
How power is obtained

Retaining well-worn valves springs is guaranteed to throw away whatever extra performance you may gain with the new cam. If the valves and guides are worn, and seats pitted, that too is another potential waste of power. Equally false economy is to retain badly-worn valve rocker gear or - for example - to retain well-worn piston rings on a new, or modified, piston. Or putting a new high-compression standard-size piston in a worn cylinder bore - even if it's only done a few thousand miles - is a waste of time.

The best way of harnessing the performance potential is having the cylinder head correctly ported (gas flowed). The emphasis is on *correctly;* each tuner is entitled to his own views on the subject. What we can offer you is the experience we have gained over the last ten years with a great number of heads ported in accordance with Yoshimura's specification and which he evolved from many years of engine preparation and dyno testing. Certain engines require a different variation on the Yoshimura theme, and some respond more effectively to head porting than others.

Pops Yoshimura porting a customer's head.

As a generalisation, Japanese engine designers have proven themselves the best in the world and the only reason their cylinder heads are not the optimum shape for best results is because of constraints imposed by mass-production. For instance, an inlet port may be routed around a cylinder head stud, or the angle of the port may have been designed to meet a purely arbitrary consideration, such as a particular set of carburettors already available in mass-production. Similar considerations can also arise in the exhaust port area, where the optimum shape, and direction, may have to be changed for the pipe to miss a frame tube (for example).

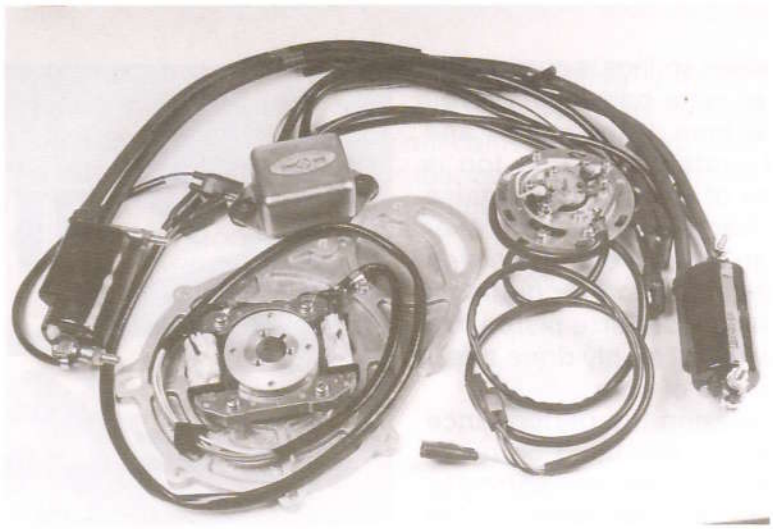


A cross-section of an early Honda twin showing the venturi - shape of the ports.

Appraisal of the designer's problem can frequently be "corrected" by judicious re-shaping but certainly not by removing the maximum amount of metal; the emphasis is on *reshaping.* There is nothing unique about this operation, but for many years the dogma was to remove the maximum amount of metal and give the remaining surface a mirror-like polish. It was assumed that because a bigger hole passes a greater volume this would improve gas flow. On inherently slow-revving engines, with very "mild" cam timing, this might have improved the situation, but the opposite holds true for today's high-revving Japanese multis. It is not so much a question of volume but the speed with which the mixture passes through the port. A sectioned Japanese cylinder head will show the venturi area (i.e. "bottle-neck") approaching the inlet valve stem (and before the exhaust valve stem), which according to the old-fashioned dogma should be removed as it was causing an "obstruction". The purpose of this venturi is to create a small vacuum, thereby boosting gas speed as the valve opens. Removal of this "bottle-neck" will positively *slow down* gas flow.

Try this simple experiment; if you want to increase the velocity of water from a garden hose, i.e. to spray it farther, you obstruct the outlet with your finger, right? So, before trying your own ideas in the cylinder head, or having someone else execute the ideas, remember metal removed cannot be replaced! (Which is why we cannot accept a head for porting which has already been tampered with by someone else).

How power is obtained



CDI ignition for Suzuki FI race engine is self - generating, provides fat, reliable, sparks at high and low engine speeds.

Finished Yoshimura - ported Honda XLS head with re-sphered combustion area.

An efficiently ported head adds not only 10% or 12% overall power increase but improves tractability, provides a smoother engine, and - most important today - *improves fuel consumption!* However, we are not all that keen on just modifying heads for these benefits alone, important as they are. Sheer hard work is involved and we would prefer to do the entire engine so that we can *guarantee* the best results to your complete safisfaction.

The XLS inlet port re-shaped and polished.

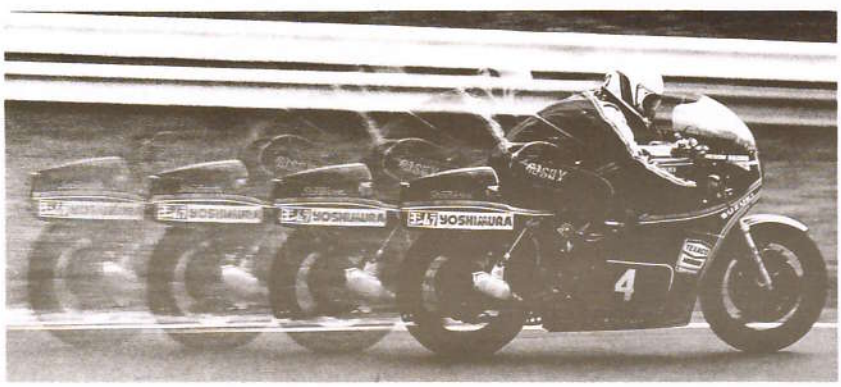


Photo by Motor Cycle Racing.

THE TRACK CANNOT LIE! "CROZ" WINS (AGAIN) ON HIS YOSHIMURA - SUZUKI FORMULA I

a High Performance Camshaft

Depending on the type of cam used, instructions will be given as to the correct installation. Some sports cams merely drop-in, others require to be degreed-in but for *optimum performance* (essential for racing) it is advisable to check that the cam is doing what it is supposed to do, i.e. opening and closing at the correct times. So, fit the new cam on the standard manufacturer's marks, and then check the opening and closing against a degree disc.

Each cam is supplied with a card giving its timing and these figures can be checked against the timing disc, which should be attached to the crankshaft. This is the procedure:

1. BOLT the timing disc to the generator side of the crankshaft.

2. FIX a piece of welding rod, or suitably stiff wire, to the same side of the crankcase; bend it to provide an "indicator" for the disc; adjust disc with the zero uppermost.

3. TIMING must be done at recommended valve lift (see card supplied with cam). This can best be achieved by using a dial gauge; alternatively, set the tappet clearances (inlet and exhaust) to 0.040" (1 mm) *plus working clearances* (shown on card).

4. ROTATE the engine to TDC (top dead centre) on No. 1 cylinder (of a multi); this is the left cylinder, as seen sitting astride the machine; TDC must be obtained on the compression stroke, i.e. with IN and EX valves closed, and the piston rising. (Check by referring to the workshop manual/handbook that TDC aligns on the ignition backplate). Ensure wire pointer is correctly aligned to TDC on timing disc.

5. CONCENTRATE on the IN valve. Carefully rotate the engine clockwise until the IN valve is opened 1 mm; check the figure indicated by the pointer on the disc against the printed "opening" figure on the card ("IN opens BTDC"). The indicated figure should be ± 1 degree, for maximum performance.

6. ADJUSTMENT can usually be obtained by slotting the cam sprocket(s) mounting holes approximately 0.020" (0.5 mm) - to the right for the top hole, and to the left for the bottom hole.

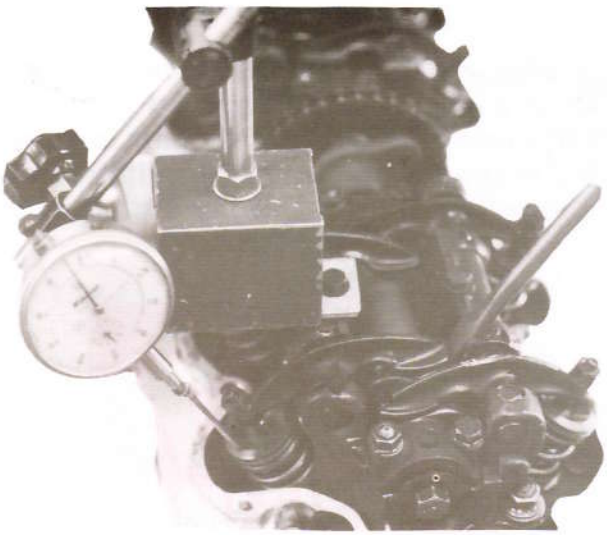
7. BECAUSE of mass-production tolerances, it may occasionally be impossible to obtain the required ± tolerances by this method, so the following should be used as a workable compromise:-

8. SPLIT the timing; add together the IN opening and EX closing figures, divide the result by 2 and fix the IN opening at this figure; do not worry about the EX timing, it must automatically follow (this applies only to single o.h.c.; twin overhead camshafts must each be degreed-in separately). Example; IN should open 15° BTDC; EX should close 15° ATDC. Your engine, IN opens 12° BTDC; EX closes 17° ATDC. Add 12 + 17 = 29 ÷ 2 = 14.5° (i.e. 15°).

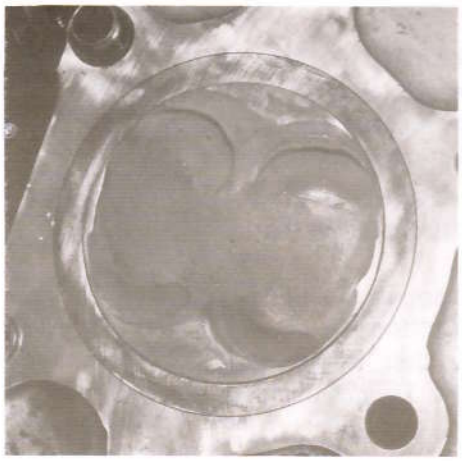
9. CHECK the tightness of the cam sprocket bolts - use Loctite (nut lock) if in doubt! Reset tappets to working clearances shown on card.

10. IGNITION timing; fix open the automatic advance/retard mechanism (if fitted); set the engine on TDC on No. 1 cylinder (on the firing stroke) rotate engine clockwise and adjust points to open at the recommended degrees (as shown on card) using a battery-operated timing light. Except when otherwise stated, it is not sufficient merely to use standard ignition timing - most Yoshimura cams operate best with advanced ignition, (as recommended). With race cams requiring up to 50 degrees ignition advance, it may be necessary to elongate the slot in the back mounting plate. If you contemplate using transistorized ignition ensure beforehand that sufficient ignition advance can be obtained; some transistorized systems are constructed only to use the manufacturer's standard ignition timing. After checking the timing is correct ± 1 degree, scribe the backplate to ensure easy checking (with a strobe, or visually), next time.

Installing cams

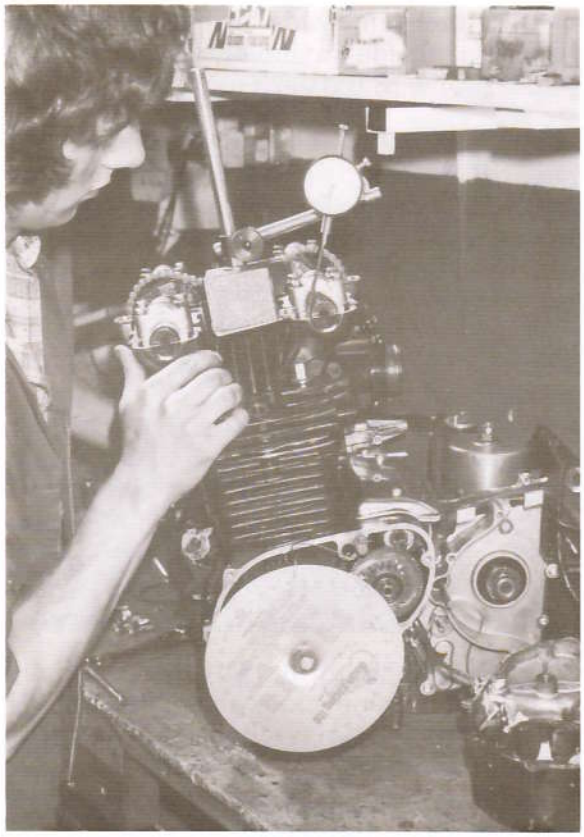


Checking the valve-to-piston clearance on a CB750K Honda - minimum should be 2mm (but the "works" team engines work to only 1mm. A missed gear change can mean bent valves !)

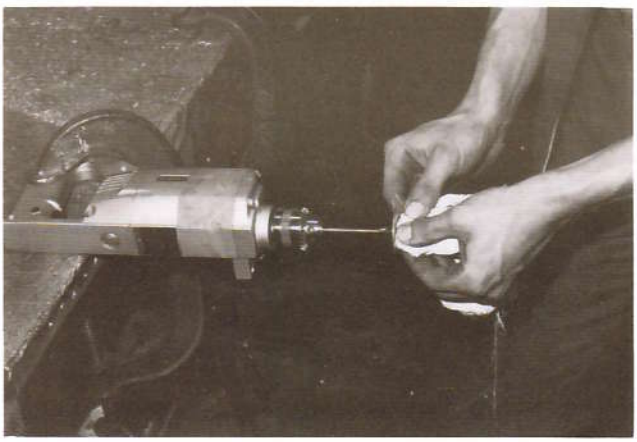


On an XL250S Honda the valves have indented the "plasticine" on the piston crown The thickness is then measured - it should not be less than 2mm

PLEASE NOTE; especially for racing cams, it is *always* advisable to check the valve-to-piston clearance (this should be a minimum of 2mm) on TDC with camshaft(s) on overlap, i.e. one valve closing, opposite valve opening. Prise open the IN (and EX) valve, by levering between the valve rocker arm and cam or between the valve and shim (Suzuki and Kawasaki); measure the amount the valve "drops" (on dial gauge) before touching the piston. Alternatively, for twin-overhead cams, coat the piston crown with a soft, pliable material ("Plasticine" or putty) or soft lead solder, turn over the engine a few times (with the completed head bolted on). Remove the head and measure the thickness of the material where indented by the valves. This thickness should be a minimum of 2mm. If insufficient clearance, either relieve the valve pockets, or pack up the cylinder by using two base gaskets.



Degreeing - in a cam, using timing disc and dial gauge.



After re-shaping (to improve gas flow), a valve is polished

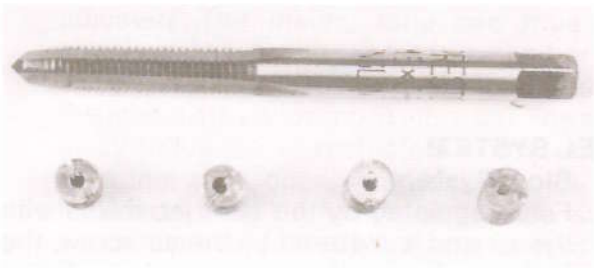
Road Carburation

Having successfully modified the engine, it is essential that your hard work be rewarded by having the correct carburettor set-up; elementary, but frequently overlooked! Contrary to popular belief, it is usually unnecessary to alter primary jets, throttle slide or needle positions on a road bike fitted with slide-type carburettors. However, it is usually necessary to increase main jet size, especially with a "full house" race engine. The exception may be with K & N washable filters, where our experience has shown a need for richening the needles by raising one notch on some Suzukis and Kawasakis. On an orthodox slide-type carburettor, one way of determining approximate main jet size is by the following rule of thumb, and then finalising the exact size by experimentation:

1. Using "Stage 1" cams, stock-size (modified) pistons, and ported head (but retaining stock exhaust and stock air filter/filters); use stock-size jet (most engines).
2. As above, but removing air filter elements, retaining filter box as still-air box, main jet size; *increase by 1;* with Suzuki GS1000, and Kawasaki 1000, up to 3 sizes bigger MAY be necessary.
3. As above, but using velocity air stacks; *increase main jet size by 2.*
4. As above, but using performance 4 in 1; *increase main jet size by 2.*
5. Stage 2 cam; big-bore piston kit; ported head; no air filters/velocity stacks; increase main jet size by at least 2, maybe 3 (depends upon local atmospheric conditions).

This is to be *used as a guide;* many variable factors must be taken into account, i.e. height above sea level, if the local weather is cold (in which case allow an additional 1 size bigger main jet); if hot weather, the engine will run richer and therefore a smaller main jet than that recommended may be used. An increasing number of new models use CV (Constant Velocity) carbs, in which the slide is raised by vacuum depression in the inlet tract. These carbs have extensive anti-emission controls whose purpose is to weaken the mid-range carburation. When the air filter(s) is (are) removed, the mid-range is hopelessly upset, frequently necessitating correction by insertion of a compensatory jet (supplied as a kit, complete with tap for threading the screw-in jet).

When the engine is run-in, do a "plug-chop", i.e. get the engine pulling hard on the main jet in fourth or fifth gear within (say) 1,000 - 2,000 r.p.m. of its maximum and cut the motor dead via the ignition switch/kill button, whilst simultaneously pulling in the clutch and coasting to a halt. Then examine the colour of the sparking plugs. An over-rich mixture leaves a sooty/black deposit around the outer edges of the plug and across the electrode; slightly rich mixture leaves less black deposit around the edges but a distinctly sooty central electrode. A correct mixture gives a light brown deposit around the plug edges and a suggestion of grey/black on the central electrode. A weak mixture gives a grey/white deposit around the edge of the plug and a similar deposit across the electrode; if it is exceptionally weak, the central electrode may turn purple/green through excessive heat. Do a similar "plug chop" at (say) 5,500 - 6,000 r.p.m. to check the mid-range carburation.

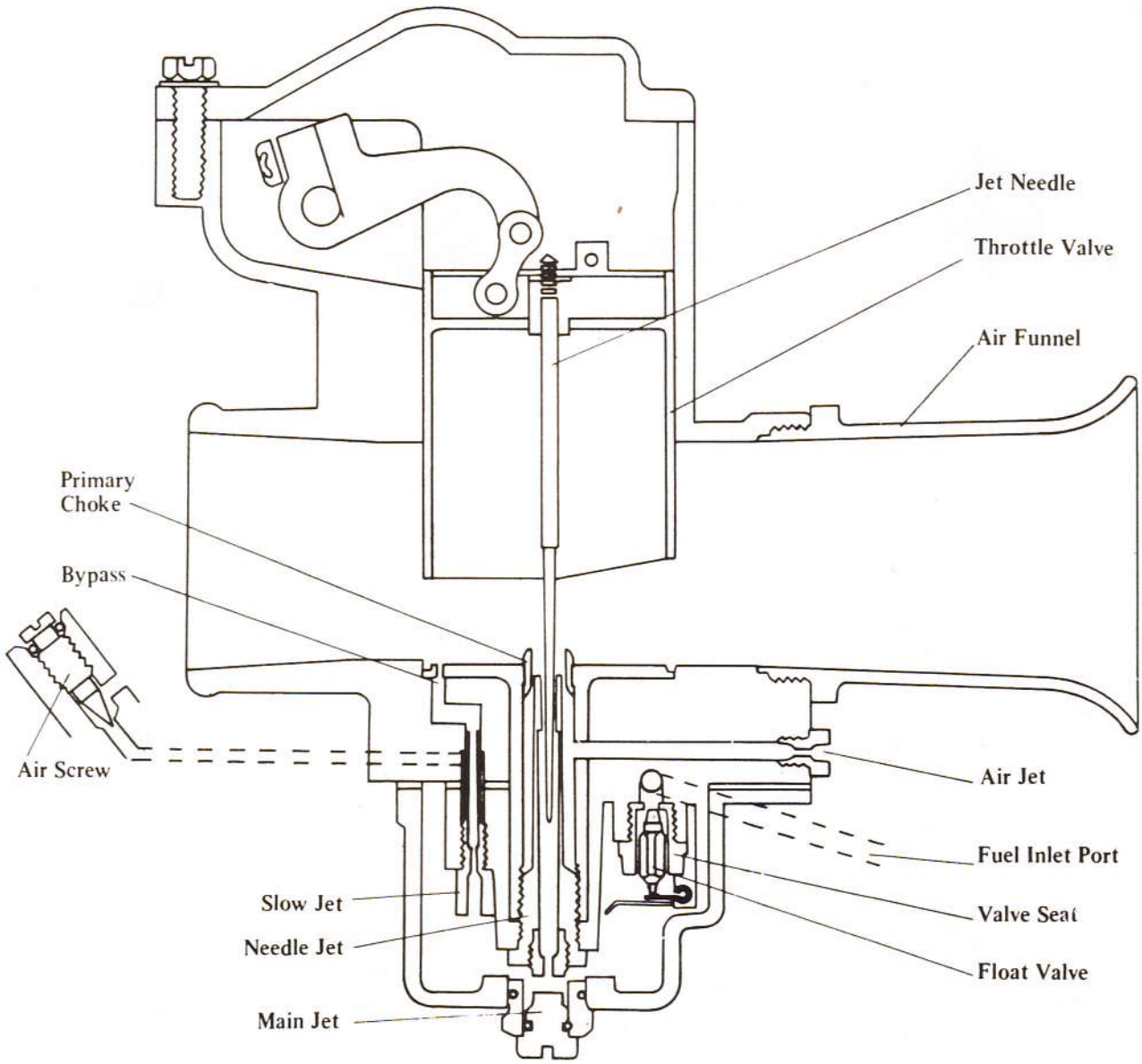


A compensatory jet kit for CV Carbs, inc. tap for threading the carb body.

KEIHIN CR Race Carburettor

AIR SYSTEM

Air enters the air funnel, passes through the throttle valve and is drawn into the engine. The amount of air is regulated by the vertical movement of the throttle valve slide.



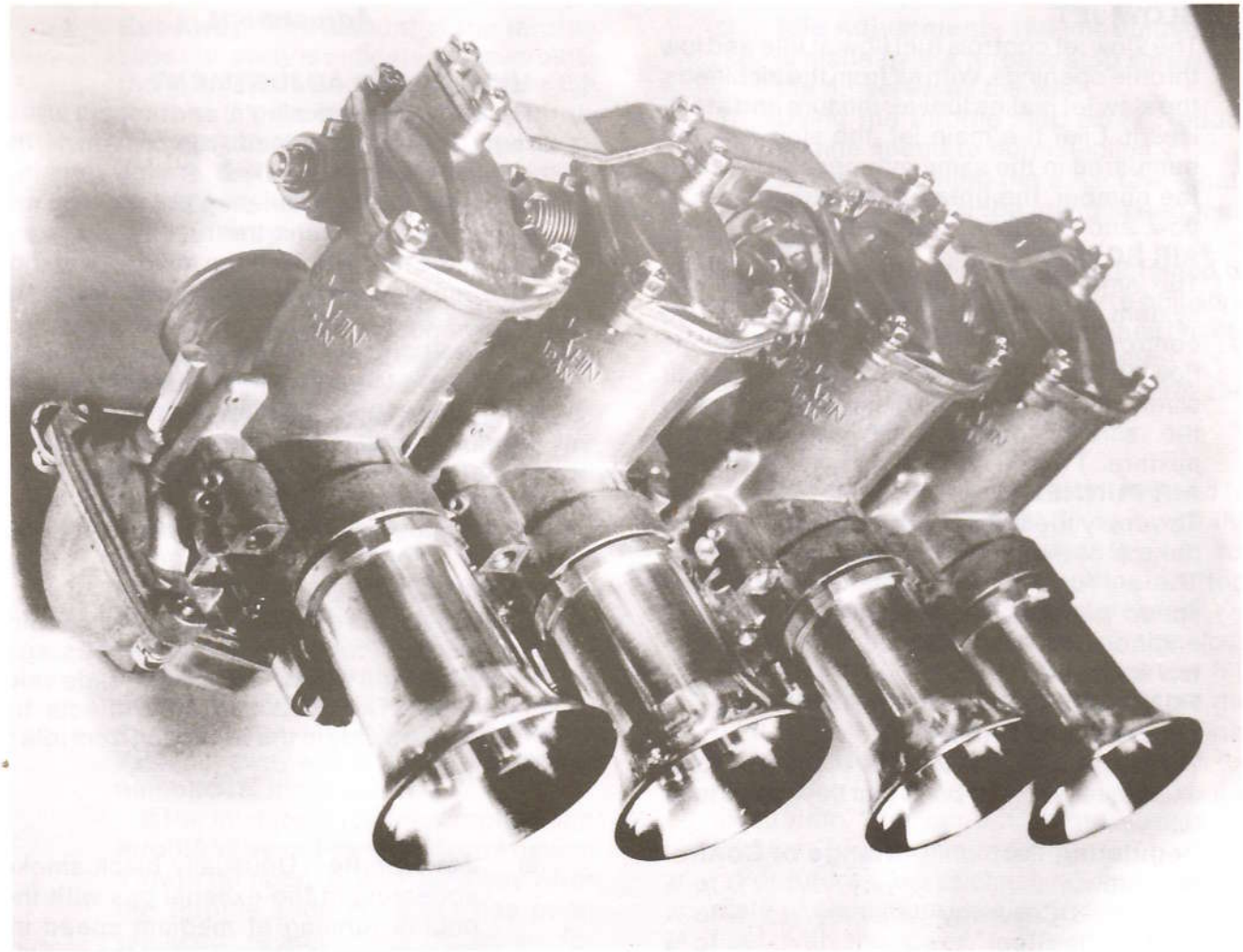
FUEL SYSTEM

a) **Slow System**

Fuel, regulated by the slow jet, mixes with the air and is metered by the air screw; the fuel-air mixture then passes through the duct and is discharged from the pilot outlet port and the bypass.

b) **Main System**

Fuel, which passes through the main jet and the needle jet then mixes with the air in the nozzle which has been metered by the air jet, then the fuel-air mixture is discharged from the tip of the nozzle. At intermediate engine speeds, air mixture is further regulated by the needle jet.



Construction and Operation

Functional Parts and Their Operation

1. **MAIN JET**
   The main jet starts regulating fuel flow when the throttle valve is half - or more - open. The higher the main jet number, the greater the fuel inflow, the richer the mixture.
2. **NEEDLE JET**
   The needle jet regulates fuel flow at medium engine speeds. Fuel flow control is shared jointly by the needle and by the jet. The needle jet bore is made to especially fine tolerances.
4. **JET NEEDLE**
   The needle, with its jet, jointly regulates the fuel-air mixture ratio when the throttle slide is between ¼ and ¾ open. As the slide moves upward, the tapered part of the needle moves out of the jet, thereby increasing the fuel flow from the jet. Five grooves around the upper end of the needle perform two functions; (1) a retaining clip seats in a groove, (2) altering the clip position affects mixture - raising the needle richens the mixture, lowering weakens it.
5. **THROTTLE VALVE**
   The throttle valve slide controls the amount of air into the engine, thereby controlling engine speed and output. This slide also plays an important part in regulating the mixture by means of the cut-away opening on the air intake side. By changing the size of this cut-away, the degree of negative pressure working on the needle jet can be adjusted. The mixing ratio can thus be changed. The slide's cut-away is numbered; the greater the cut-away number, the leaner the mixture (by allowing in more air). The cut-away influence is restricted to the range from idle to ¼ open, and ceases to be an influence past ½ throttle. A throttle stop screw is provided for slide adjustment when the engine idles; as the adjustment screw is turned in, the slide goes up, turning out the screw lowers the slide.

6. **SLOW JET**
The slow jet controls fuel flow at idle and low throttle openings. With air from the air bleeds, the slow jet makes fuel-air mixture and atomizes it. Like the main jet, the slow jets are numbered in the same manner - the greater the number, the greater the amount of fuel flow, and the richer the mixture.

7. **AIR SCREW**
The amount of air entering the slow fuel system is controlled by the air screw; it also controls air to be mixed with fuel which is flowing through the slow jet. Turning the air screw clockwise richens the mixture; adjusting the screw counter-clockwise leans the mixture.

8. **AIR FUNNEL**
To supply the engine with a laminar air flow, the top of the air funnel is trumpet-shaped. The air funnel overall length affects low-speed performance; a long funnel for low engine-speed performance, short funnel for top-end power.

9. **FUNCTIONING RANGES ASSIGNED TO VARIOUS PARTS**
The range of control over the ingoing mixture exercised by those parts just described is as follows:-

Regulating Part	Range of Control
Air Screw	0 to 1/8
Slow Jet & Cut-Away	1/8 to 1/4
Jet Needle Step	1/4 to 3/4
Main Jet & Air Jet	3/4 to Full Throttle

These are not absolute cut-offs as there are overlaps from the parts which control the adjacent ranges.

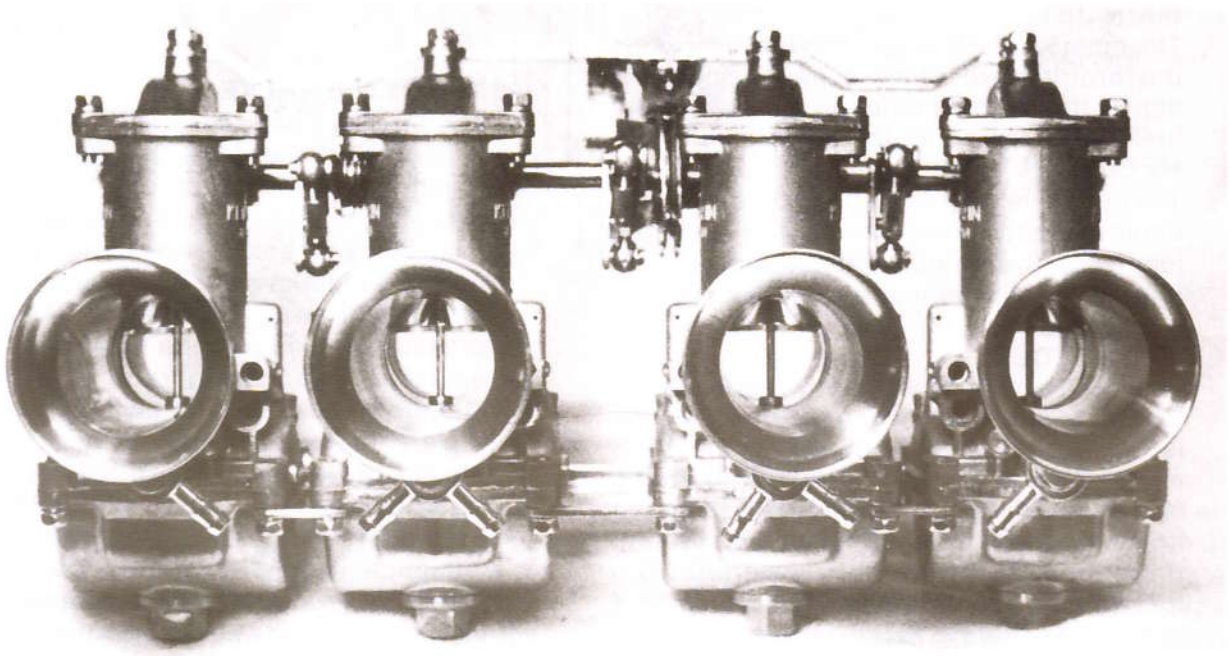
Adjustment

1. **HIGH SPEED ADJUSTMENT**
Remove the spark plug(s) and inspect after a high speed, high load, run in which the engine has been "killed" at high revs in a high gear. If the main plug point is wet and blackened, it means the fuel-air mixture is much too rich. Replace the main jet with one size smaller and try another run until the plugs "read" a light brown.

If the point is dry and white, it means the main jet is too small. Install larger main jets until the engine burbles or misfires on full load, indicating too-rich mixture. Then replace the main jet with one smaller, this is the correct main jet (plug colour; light brown on edges, greyish/black on centre electrode).

2. **MEDIUM SPEED ADJUSTMENT**
The fuel mixture within the throttle opening range from 1/8 to 3/4 is controlled by the step of the jet needle and by the throttle slide valve cut-away. (The slide cut-away affects the fuel mixture only in the transition from idle to 1/4 throttle).

a) **Jet Needle** - Unusually black smoke appearing in the exhaust gas with the engine running at medium speed indicates rich mixture. Lower the needle one groove into the needle jet. If, on the other hand, the engine hesitates or misfires while accelerating, lift the needle one notch upward.



b) **Cut-Away** - The amount of the throttle slide cut-away is indicated by numbers; the greater the number, the leaner the mixture. As the throttle slide controls mixture density for both the medium-speed and low-speed ranges, care should be taken in selecting or adjusting the cut-away.

3. LOW SPEED ADJUSTMENT

The fuel mixture within the opening range from idle to ⅛ is controlled by the air screw and the throttle slide cut-away.

a) **Air Screw** - Turning the air screw clockwise richens the mixture. Turning the screw counter-clockwise weakens the mixture. NOTE: the air screw adjustment should be made not only for correct idling, but also for smooth transition to slow jet and slide cut-away stage.

b) **Throttle Slide Valve Cut-Away** - Occasionally, the mixture density before and after ⅛ throttle opening cannot be adjusted by the air screw alone. If the mixture is too rich, replace the throttle valve cut-away with one having a greater number, i.e. more cut-away.

If the mixture is too lean, replace the throttle valve cut-away with one having a lower number, i.e. less cut-away. After the throttle slide cut-away has been replaced, re-adjust the air screw for correct idling.

c) **Idle Adjustment** - The idle adjustment is made by the throttle stop screw and the air screw as follows:

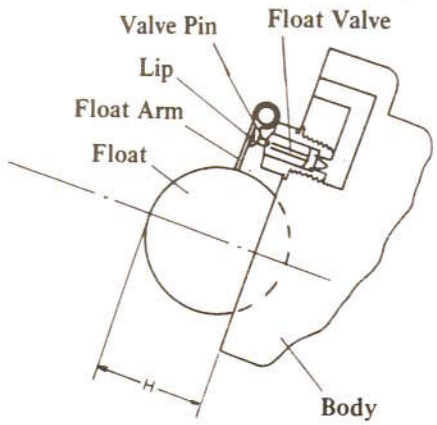
1) Using the throttle stop screw, reduce engine speed to normal idling.
2) By slowly turning the air screw, locate the point where the idling speed rises to maximum, i.e. "races."
3) Reduce the engine speed obtained by (2) above to normal idling by re-adjusting the throttle stop screw. (It should finalise between ⅛ and ¼ turn outward).
4) Adjust the air screw once more; this completes idle adjustments.

4. FUEL LEVEL ADJUSTMENT

As illustrated, the fuel level is determined by the height "H" of the float (shown with the float bowl removed). The float level is *not* that obtained with the carburettor inverted, and the float valve spring compressed.

With the float arm pin above the float, rotate the carburettor approximately 70 degrees from its working position until the float arm is in *light* contact with the float valve tip. Hold the carb in this position for measuring float height, as shown in the illustration. The correct height should be 22.5mm, plus or minus 1mm.

For future ease of checking, make a template of aluminium shaped to fit around the float, with the lower "leg" exactly 22.5mm long.

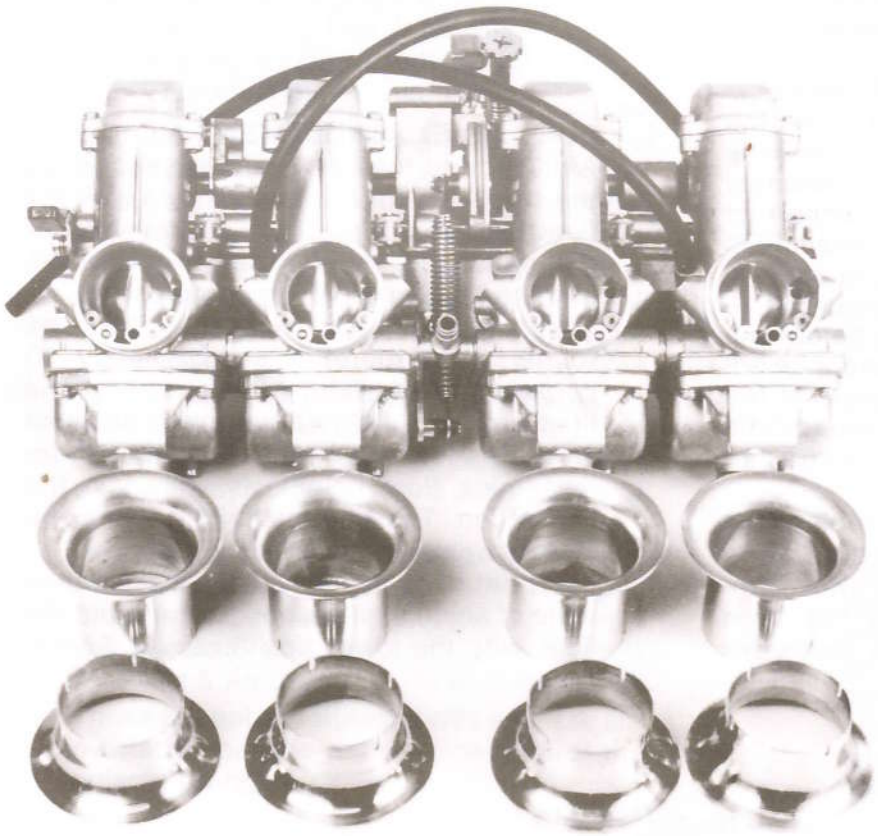


Type	Size	Main Jet	Air Jet	Jet Needle	Cutaway	Slow	Air Screw
CR900	31mm	115	200	R CZ-4th	No.3	No. 60	1 turn
CR750	31mm	115	200	R CZ-3rd	No.3	No. 60	1 turn
CR500	31mm	110	250	R H3-4th	No.3	No. 55	1 turn
CR350	31mm	110	250	R H3-4th	No.2	No. 55	1 turn
CR250S	31mm	115	160	R GA4-3rd	No.2	No. 55	1 turn
CR125S	31mm	130	250	R CZ4-3rd	No.3	No. 60	1 turn

MIKUNI Carburettor

Originally developed by Pops Yoshimura in conjunction with the Mikuni Carburettor Company, the "Smoothbore" carburettor has achieved a legendary reputation through innumerable racing successes, from Daytona Beach (U.S.A.) to the Isle of Man and Suzuka (Japan).

The main difference between the Smoothbore and the standard production Mikuni is that internally the Smoothbore uses fewer low-speed airways and those which are used are designed to provide a smooth-flowing passage of air into the inlet tract. The inside of the carburettor body is smoothly-contoured, again to provide obstruction-free passage of air to the engine.



The Supercarbs come ready to bolt on, but without a venturi. For max. power, use the short (34mm) venturi. The 74mm is for low-down power. Two types of Smoothbore - for Kawasaki or Suzuki (specify which when re-ordering).

The carburettor functions in exactly the same way as the standard production one, controlling air and petrol mixture through pilot jet, slide, needle, and main jet. The Smoothbore main jets use the same thread as the standard production carb and a full range is available. Occasionally, it may be necessary to change the Smoothbore pilot jets, and they too are available. The carburettors come already set up for the individual engine - Suzuki or Kawasaki - and it is usually unnecessary to change the slide cutaway. The needle has five notches and can be altered in the usual way, should this be necessary.

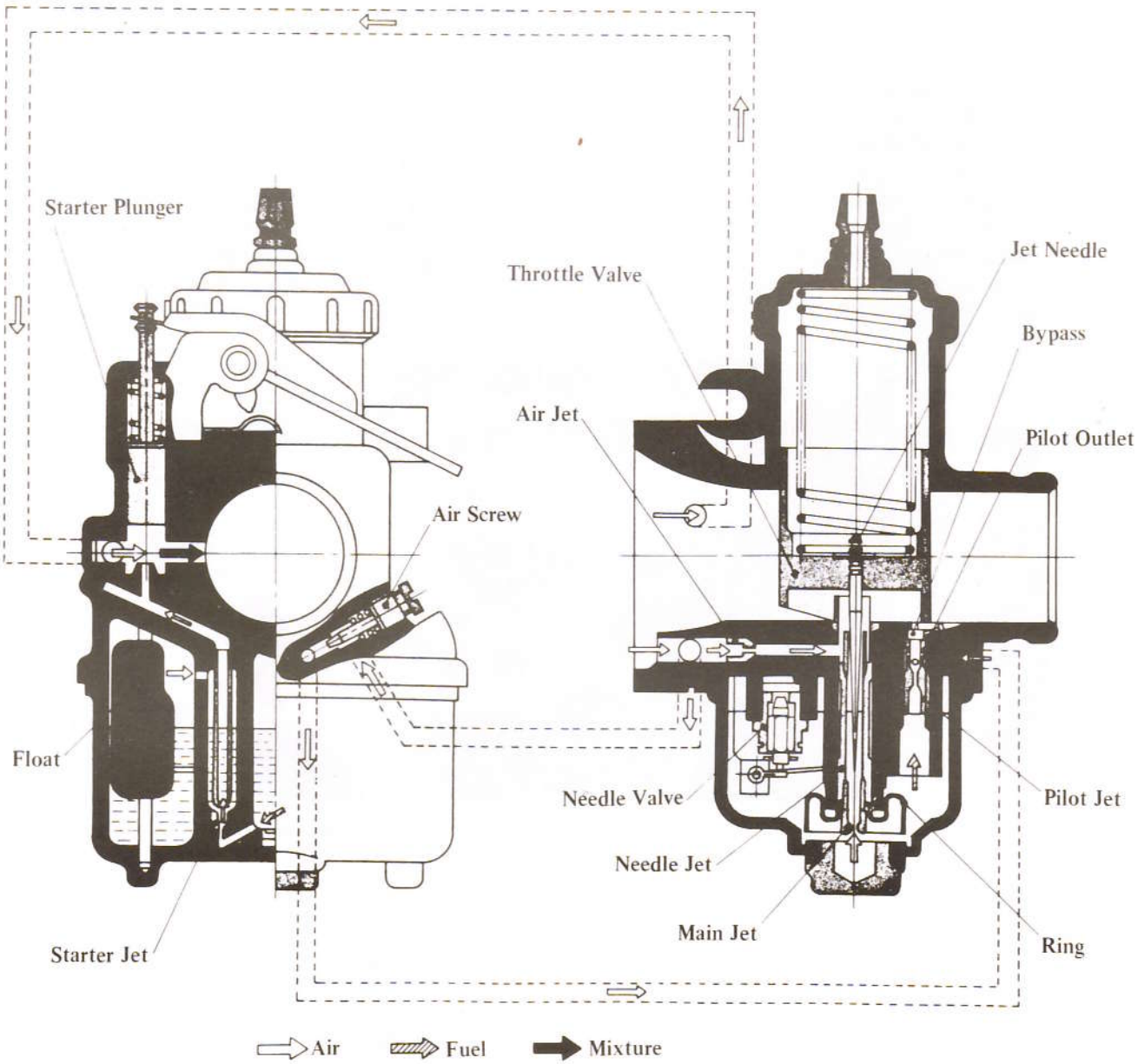
Apart from altering the main jet to suit individual engine requirements, the only other alteration normally necessary is if K & N air filters are used. The fitting of these almost invariably alters not only the main jet but also the needle settings and sometimes considerable experimentation is necessary to find the ideal combination of needle/main jet settings.

Externally, Smoothbores appear very similar to standard production carburettors, which is not surprising since they evolve from the same castings. However, a major difference is that the Smoothbore main jets can be reached via a threaded boss on the base of the float bowl (changing the jet on the standard item entails removing the entire float bowl).

The Smoothbores utilise the standard Mikuni operating linkage and in changing over from a standard carburettor all you need do is hitch on the standard throttle cables to the Smoothbore. They fit the standard Suzuki and Kawasaki cylinder head mountings.

It is estimated that, correctly jetted, Smoothbore carburettors provide approximately 12% extra power over standard carburettors - but this may vary depending upon state of tune of the individual engine. Certainly, the effect is very noticeable as soon as you whack the throttle!

MIKUNI Carburettor

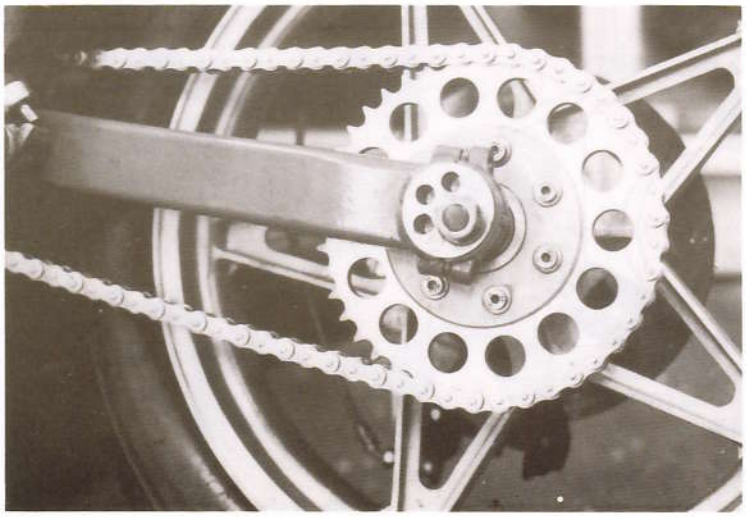


Manufacturers know best, they invariably go for mechanical safety and so they usually over-gear their models so they cannot be over-revved in top gear when driven flat out along freeways or motorways (even allowing that the rider is almost certainly breaking local speed limits!).

One of the most popular misconceptions is that raising the gearing of a stock machine produces more speed. In fact, it will usually achieve the opposite by not only reducing the bike's top speed but also increasing fuel consumption, because more use is required of the intermediate gears to maintain an acceptable cruising speed (due to the higher top gear). However, an exception to this rule is the fitting of a full frontal fairing; then it may prove worthwhile to raise the gearing because of the reduction in wind pressure (due to better penetration), and thereby allowing a higher cruising speed. Incidentally, if the fairing is truly efficient, not only will cruising speed be higher on the same throttle openings as previously, but fuel consumption should also improve.

The smaller the engine, the more critical the gearing. For instance, the Yoshimura CB400F 458cc cam and piston conversion develops peak power at 11,000 - 11,500 r.p.m. and in no way (under normal street circumstances) can that be achieved on stock gearing. So the smart trick is to swop the stock gearbox sprocket for one (or two) teeth less. That will allow you to out-accelerate not only most 500's but also some 750's up to 80 - 85 m.p.h.! And it should reach a top speed of 115 m.p.h.

Take a tip from the road racer's routine. On arrival at a circuit, he estimates what gearing to use. In the first practice session he has already fitted the rear wheel (or gearbox) sprocket which he thinks will allow him pull peak-power r.p.m. in top gear on the fastest part of the circuit. That first session will show whether his guess is proven right. Remember, he is not interested in what *speed* he is doing; - he knows that if his engine is achieving peak-power r.p.m. he will be going as fast as conditions allow, regardless of what that speed is. Alternatively, if his engine is revving beyond peak-power r.p.m., he knows he is under-geared and will accordingly fit a smaller rear wheel sprocket (or bigger gearbox sprocket) to raise the overall gearing.

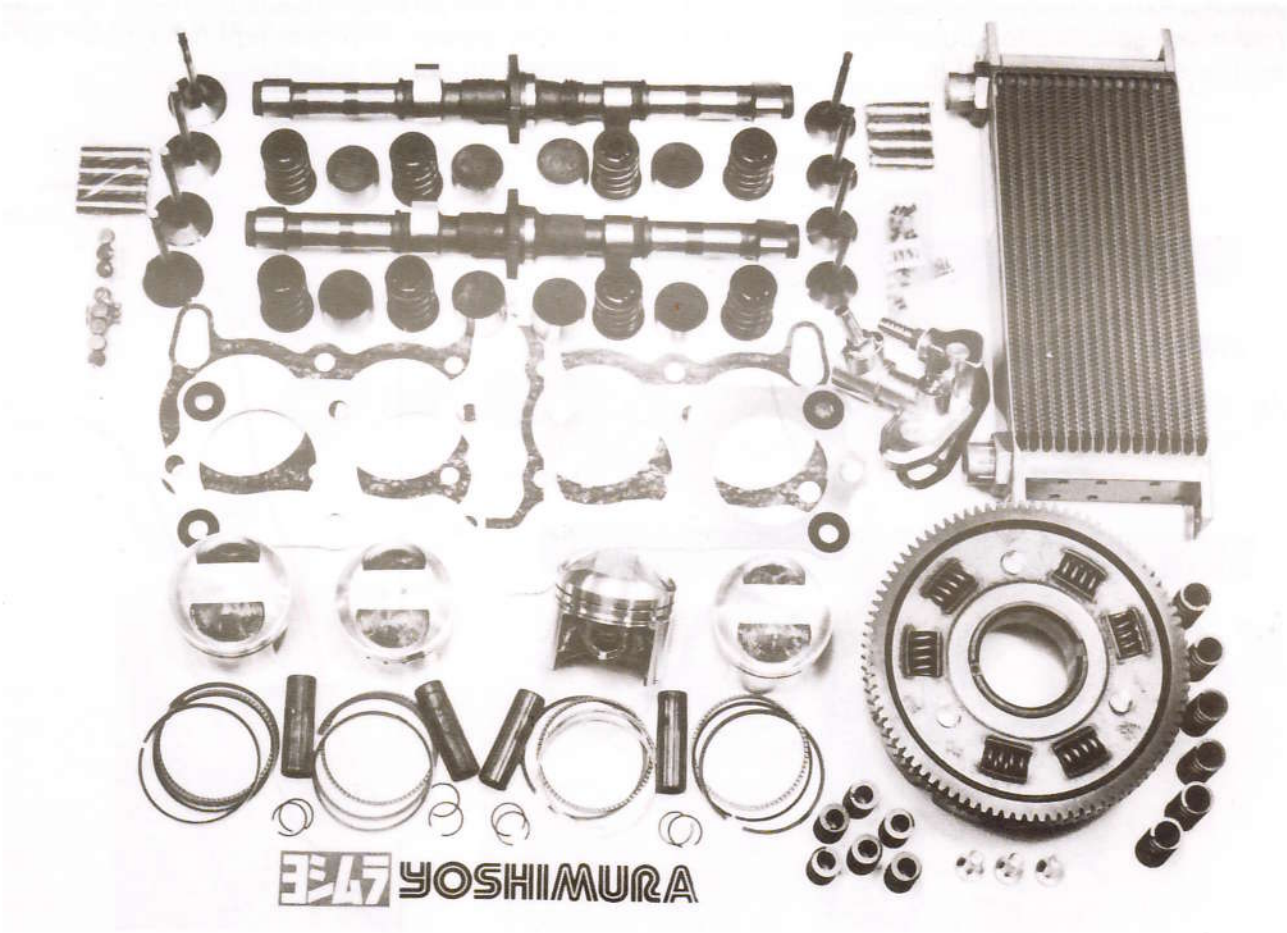


Gearing on some machines, such as this Bimota, is more easily altered by changing the rear sprocket (note the Tsubaki nickel-plated chain, prevents rust, smart appearance).

But some stock motors are so over-geared that their acceleration and top speeds would be improved merely by *reducing* the overall gearing, by fitting either one tooth less on the gearbox sprocket or - alternatively - putting two or three teeth more on the rear wheel sprocket (which may entail lengthening the chain). Gearing becomes even more important on a tuned engine; it will produce sufficient extra power to pull a top gear slightly higher than standard (in some cases) but the aim should be to see peak r.p.m. (red line) in top gear in optimum conditions, i.e. a very long straight and in still air. With maximum speed limits now enforced virtually worldwide, greater emphasis on improving acceleration should be the aim. It's nice to know the bike will be capable of 140 m.p.h., if required - but where can you do it legally, and in safety ?

For single cylinder freaks, the picture is slightly different. When fitting a big-bore kit for street use, it sometimes pays to raise overall gearing. The reason is, that a bigger piston - especially on a single - provides more torque, i.e. bottom-end power, than stock. This extra torque should allow a higher top gear to be pulled, at lower r.p.m.

Some of the most exciting racing in recent years, and certainly the most thrilling sounds!, have been in Formula 1. We were in on the "ground floor" in 1978 with our Bimota-Yoshimura Suzuki (rider Bill Smith), and Charlie Williams on a Honda in 1979. Additionally, we have supplied parts, complete engines or complete bikes for other Formula 1 competitors, including Mick Grant, John Newbold, Alan Jackson, Danny Shimmin, Sam McClements, etc.



The Yoshimura - Suzuki Formula 1 race engine kit - not recommended for road use ! But a de-tuned "economy" version is available.

Demand for road-going Formula 1 kits followed and out of this we have evolved a selection of parts, which give you the optimum performance for a road bike, without diminishing reliability.

This is how it works; give us your machine and we give the engine a complete stripdown, renew any worn standard parts (which are paid for separately, with your approval); then we overbore the block for the big-bore kit (we are not restricted to the 1,000cc Formula 1 limit), and we match each piston to its bore for precise fit. The engine is then re-assembled with the following parts added:

Production Race camshaft
Race Valve Spring Kit (installed)
Valves re-profiled, polished, lightened, re-seated and installed
The cam(s) and ignition timing are degreed-in
The carburettors are re-jetted (or modified) as necessary
The engine re-fitted together with an oil cooler and a performance 4 in 1 exhaust, and road tested by us. All running adjustments are checked, and corrected, where necessary.

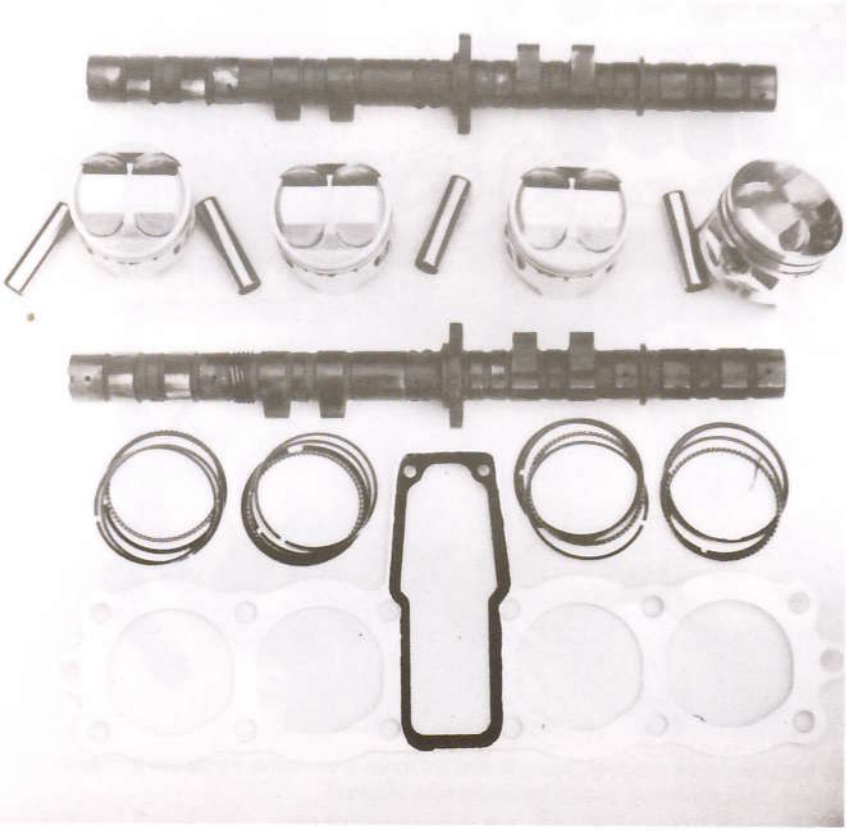
Formula 1 road kits

Along with the engine goes our Formula 1 engine certificate, road tester's report and a three months' guarantee against defective parts or workmanship. This warranty does not apply if the engine is raced; if you want a Formula 1 full-race engine, we will happily build it for you, the price depends upon the specification required and whether you want us to modify yours, or to supply a complete motor.

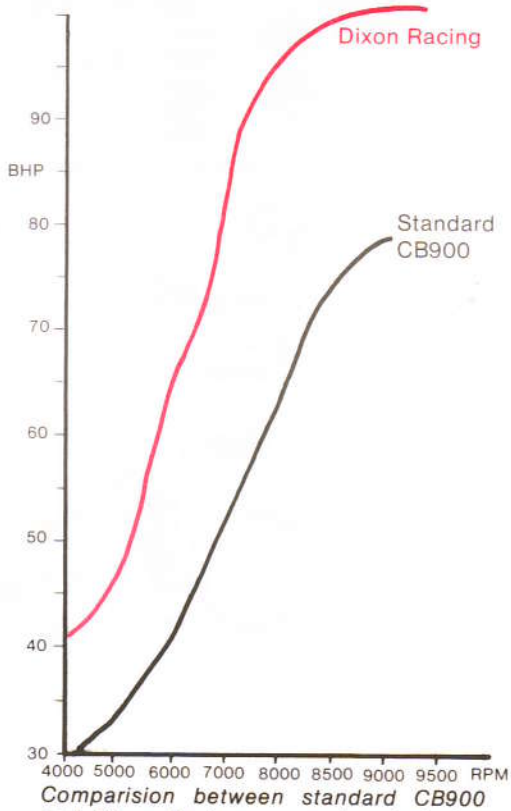
Optional extra; the cylinder head can be ported to Yoshimura-specification, but should be specified when the engine is booked in.

To ease the financial burden, we can offer finance assistance, subject to the Finance Company's approval.

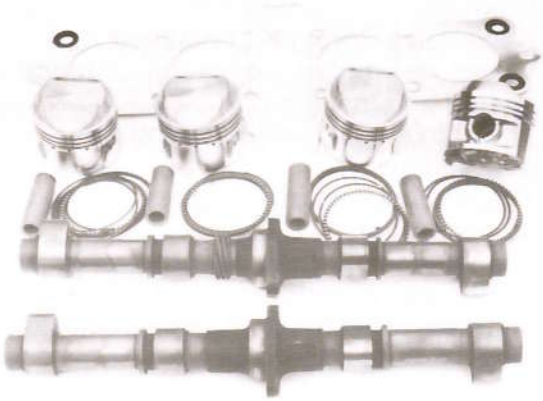
Obviously, to obtain the optimum performance from the converted engine it is advisable, after carefully running-in, to check-out the carburation, in accordance with the information given on the chapter on carburation. It is equally important to read the chapter on gearing, because it is not unknown for an enthusiastic customer to expect a 500% power improvement and gear up in anticipation of 200 m.p.h.!



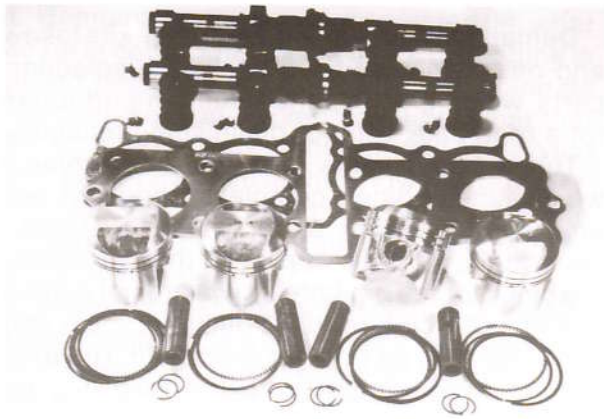
Honda CB900 Formula 1 kit, with Dixon Racing cams and either RSC or Moriwaki big - bore kit. (Moriwaki shown here).



Comparision between standard CB900 and Dixon Racing conversion, including Dellorto carburettors, special cams, 996 (or 987cc) h/c pistons and 4 in 1 exhaust.



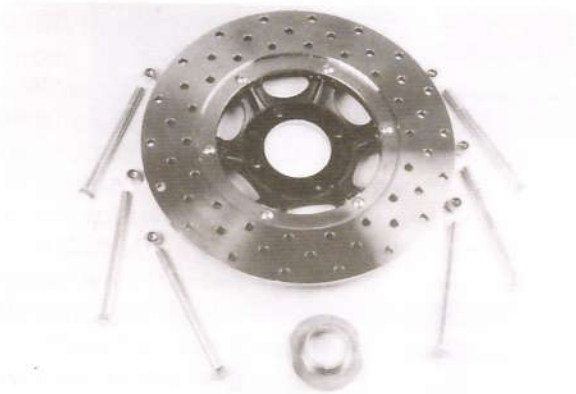
Yoshimura - Suzuki kit for GS550 to 610cc.



Yoshimura - Suzuki 1023cc big bore cam and piston kit, including race valve springs.

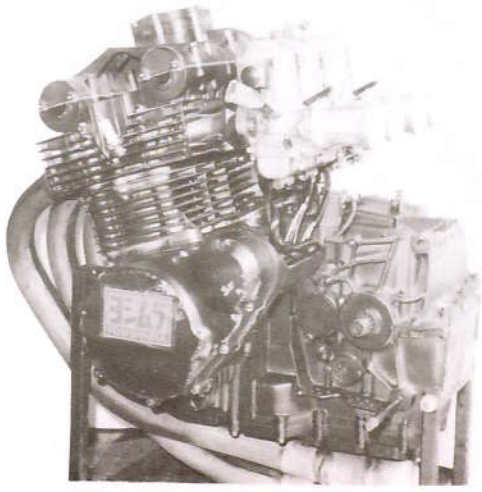
Formula 1 road kits

More speed needs better stopping and, if you intend to use the extra power, improved road holding. Whereas the manufacturer's original brakes, suspension units, and tyres were perfectly adequate for the machine's original performance, a marked performance improvement may reveal handling and braking limitations. Obviously, you can obtain better tyres, improved brake parts and better suspension units locally, but if not, we shall be happy to provide advice and supply the necessary items where possible.



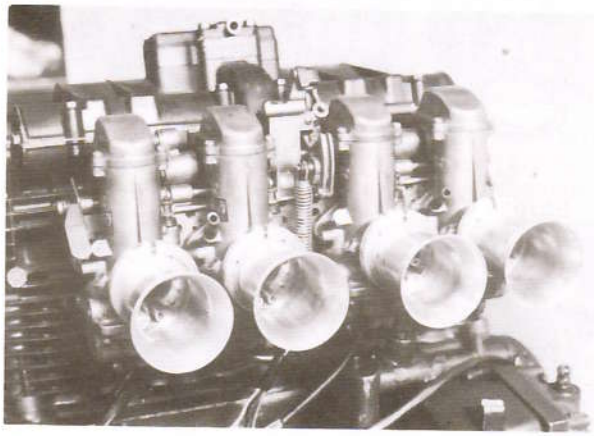
Above: A twin-disc conversion for an old Honda.

Commonly used in racing, Aeroquip steel-braided brake hose provides more "bite" when braking is critical



Extra power and speed needs taming: This CB900 steering damper comes complete with mountings.

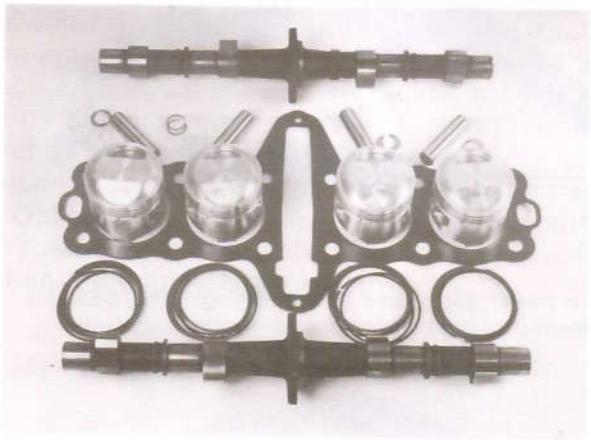
Twin brake hose specially designed for twin disc conversions.

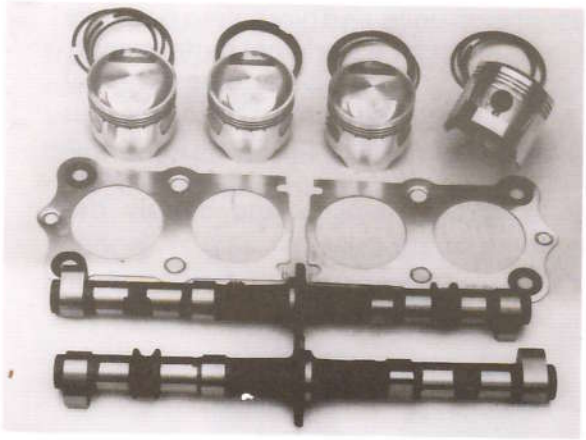


Optional extra on most kits is Mikuni Smoothbore carbs (seen here on a factory race engine).

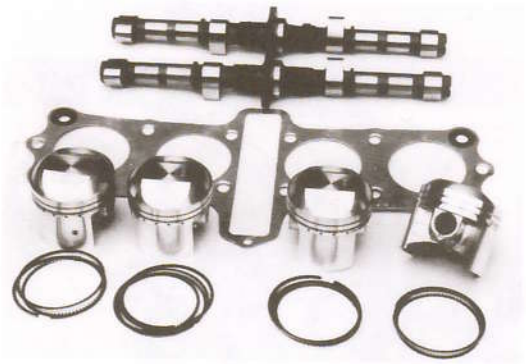
Pops Yoshimura builds replicas of his own "works" engines for sale to top riders - this one went to Mick Grant.

SOME POPULAR YOSHIMURA CAM & PISTON KITS



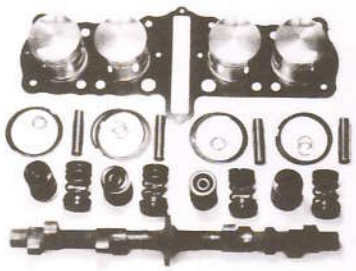


Above: Kawasaki Z-650 to 610cc. Right: Z-900 to 984 (or 998)cc.

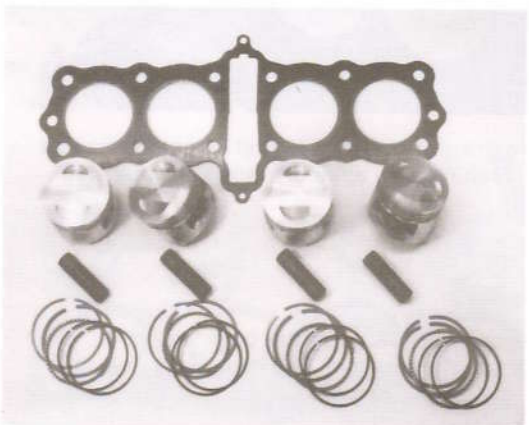


GS1000 70mm (998cc) h/comp Kit 4011, with Stage 1 cams.

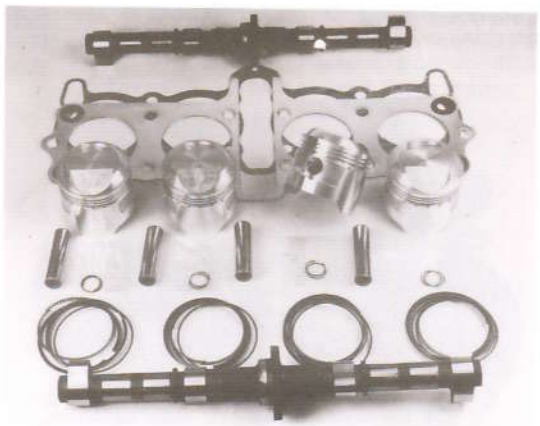
Above: CB460cc is still very popular.



CB750 K and F to 812cc was earliest Yoshimura kit, is still in great demand!



Left: Honda CB550 to 600cc packs lots more punch! Right GS750 to 850cc kit



YOSHIMURA

YOSHIMURA

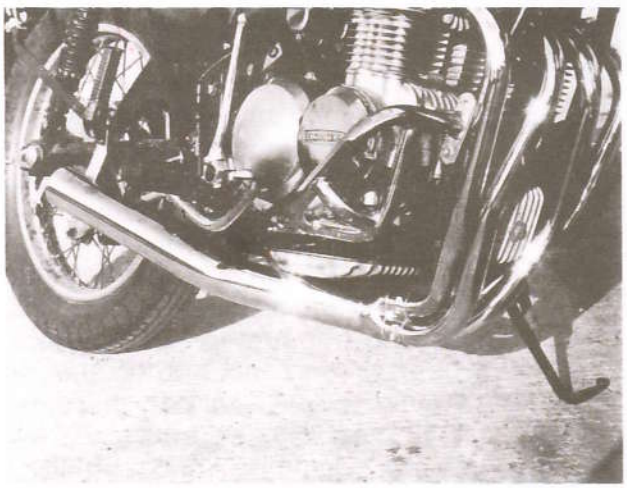
Exhaust Systems

One of the very first CB500 Hondas into the U.K. (1972) was used in the Dixon Racing school as the instructor's bike. Fired by (misguided) enthusiasm, David Dixon spent three days making up four straight-through exhausts and special megaphones. Correctly jetted, itself a major task in those days, the bike sounded unbelievable - like the old MV Agusta fours - but, boy, was it slow! In fact it was slower with the four straight-through megaphones than with the standard silencers. Lesson number one, the Japanese know how to make very efficient standard exhaust systems!

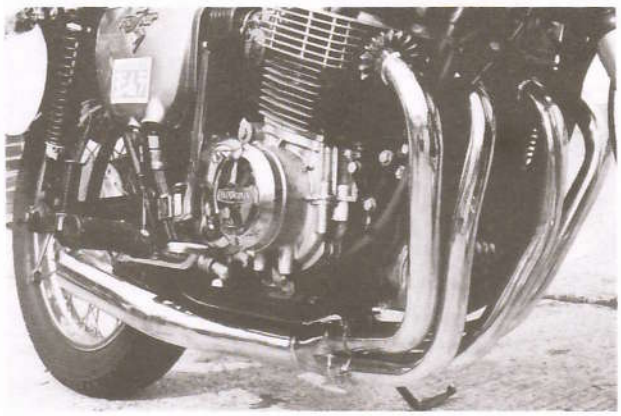
In the Autumn of the same year, Dixon met Yoshimura and learnt just how much work goes into a truly efficient *performance* exhaust. On the CB500, Pops was forced to drop all pre-conceived notions and spent no less than five weeks developing a system to give the ultimate performance, *throughout the range*. The previous year, Pops had spent four weeks making a race 4 in 1 for the CB750 Honda; the formula used for that exhaust was absolutely useless when applied to the CB500 engine! Thereafter, each individual engine was treated on its own merits and an exhaust was evolved for it starting with basic principles, but the final form was achieved ater painstaking trial-and-error on the dyno.

A pioneer of 4 in 1 exhausts, Yoshimura has been universally copied but his original Honda, Kawasaki, and Suzuki designs are still the most popular genuine performance systems on the market. For European requirements, new systems are now developed and made in the U.K. under licence to Yoshimura. He inspects, and approves, each design before it reaches production. Each pipe is chromium plated to B.S.I. 1224 "severe outdoor use."

Pops Yoshimura (left) and David Dixon (seen here in the Isle of Man) have been associated since 1972, when Dixon was appointed European and African Distributor.



Earliest Yoshimura 4 in 1 were for CB500 and 750 Hondas, evolved from race systems.
Above: CB500 Honda 4 in 1 also fits CB550.



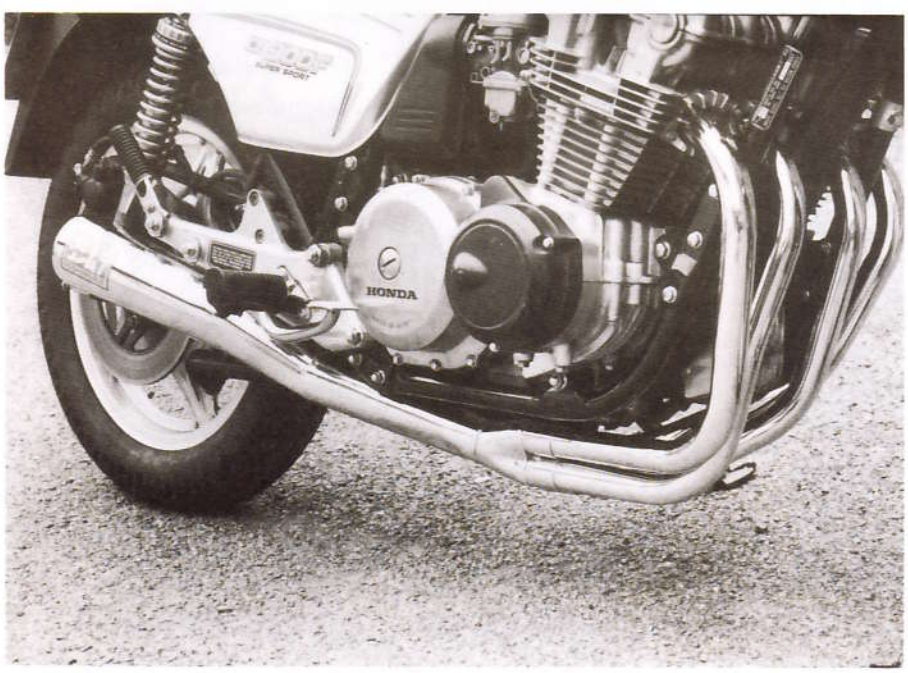
Right: There are different versions of CB750 4 in 1 to fit K and F models.

YOSHIMURA exhaust systems

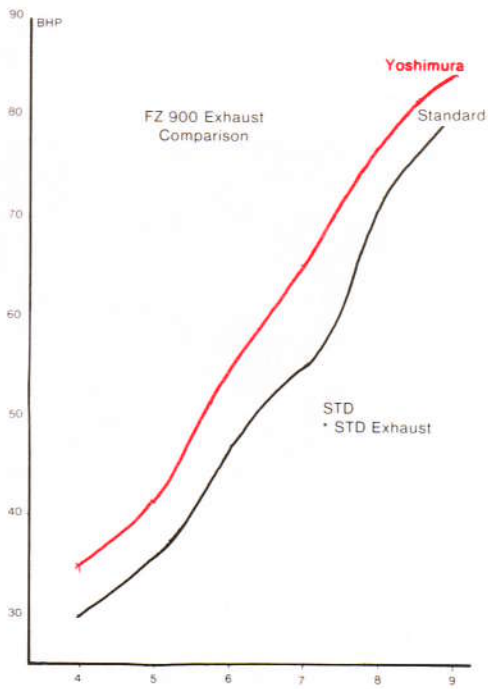
Having absorbed the first painful lesson (that the Japanese make extraordinarily good exhaust systems), came the big question; how to improve on them? Long gone are the days of "suck it and see," cutting and shaping dozens of bits of tube to find the right combination of length and diameter. Much more is now know about the behaviour of exhaust gases (pessimists may claim, perhaps with justification, we are only beginning to learn...), and so much information has now been amassed over the past couple of years that a computer programme can be planned for specific requirements. For instance Yoshimura's original 4 in 1 systems were designed to provide optimum performance with his race-tuning kits. The best results were obtained with a straight-through tail pipe on the track. For road use, a single baffle was fitted, which inevitably stole some performance. In recent years, many people have fitted non-standard replacement exhausts, but without modifying their engine, (stock replacement exhausts having become horrendously expensive). For this reason, European requirements have been for an exhaust which improves the performance of a *standard* unmodified engine. And this is the basis upon which European-Yoshimura exhausts differ from those developed in Japan and America (where ultimate race track performance may be the criteria).

The computer programme result is translated into metal form, i.e. primary pipe lengths, but this is only a starting point; the engine is tested for maximum power on the pipe lengths supplied by the computer, and those lengths are then varied until they provide the optimum results. They are then joined to a collector tailpipe which is to act as the silencer. At this point we have achieved the optimum possible power increase *throughout the range*, but the problem now to be solved is how to retain as much as possible of that power, yet reduce the noise level to within legal limits. And that is one big headache!

For example, the prototype Yoshimura CB900 4 in 1 system provided a 24% power improvement over the standard system after only five dyno tests. But it took another 43 dyno tests, (and 2½ months), before the noise level could be brought within the 86 d.b.a. legal limit! In so doing, 20% (mid-range) of the power was retained and 15% of the top-end (peak power). But the end result has been extremely satisfying because that particular exhaust has since become *the* definitive system for the Honda CB900.



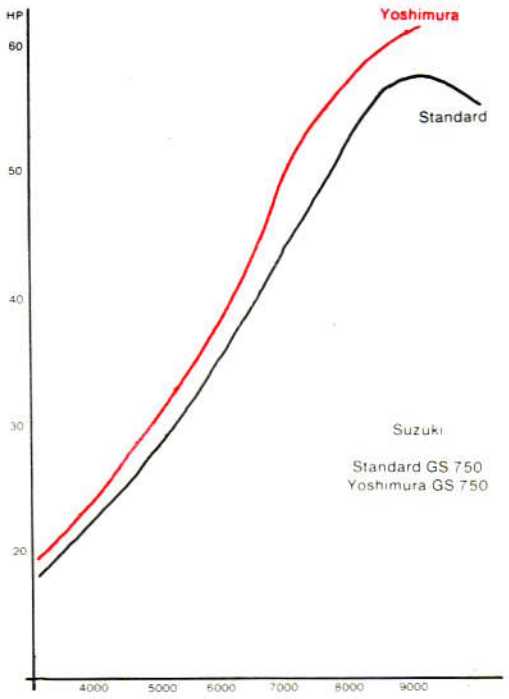
CB900 pipe took 48 dyno tests to develop; large capacity silencer contains a number of elements to reduce noise below legal limits.



Power curve shows improvement over standard 4 in 2 system.

Depending upon engine, the Yoshimura 4 in 1 performance system gives between 10% and 20% (plus) power improvement. Some engines respond better than others; the one criterium Pops insists on is that each system to bear his name *must* produce more power than standard. This is his personal guarantee. There are other advantages; if the stock exhaust is damaged, or burnt out, his performance one is considerably cheaper and lighter.

Yoshimura GS1000 4 in 1 is well tucked in, neat and quiet. Engine oil drain plug is accessible.



Power curve of GS750 system (stock engine); percentage power increase is even greater on GS1000.

Obviously, a 4 in 1 is a considerable weight saving over a bulky two or four-pipe system, and access to the rear wheel is greatly facilitated. Not everyone would agree, but most feel that the appearance of the bike is considerably enhanced by a 4 in 1. Further advantages are; the primary pipes are not welded to the collector, they are clamped, which makes for easier assembly (less bulky, and more economical, in transportation). The primary pipes are numbered, to coincide with matching numbers in the collector in which they can only be assembled the correct way! The centre stand can be retained; the 4 in 1 comes complete with a centre stand stop. On Hondas, sufficient room is left for you to remove the oil filter without disturbing the 4 in 1; on Kawasakis and Suzukis, room is left for you to drain the engine oil (but not remove the filter) without removing the 4 in 1. (Similar remarks also apply to the Yoshimura twin cylinder 2 in 1).

NOISE; some folk believe noise to be synonymous with speed - not so! Welded into each collector are a series of steel baffles which effectively reduce the noise level to within current legal limits (83 d.b.a. for up to 250cc; 86 d.b.a. over). Noisy bikes antagonise the public, provide more ammunition for anti-motorcycling organisations and, in the long term, may result in Government legislation restricting the freedom we now enjoy. *It is our duty to ensure we do not prejudice that freedom!*

Some engines benefit from re-jetting after fitting the 4 in 1, others work happily on the standard jets. It is advisable to enquire when purchasing the system if re-jetting is required. (We stock oversize jets).

We import thousands of oversize jets - not only for those Yoshimura systems that need them, but for other firm's exhausts!

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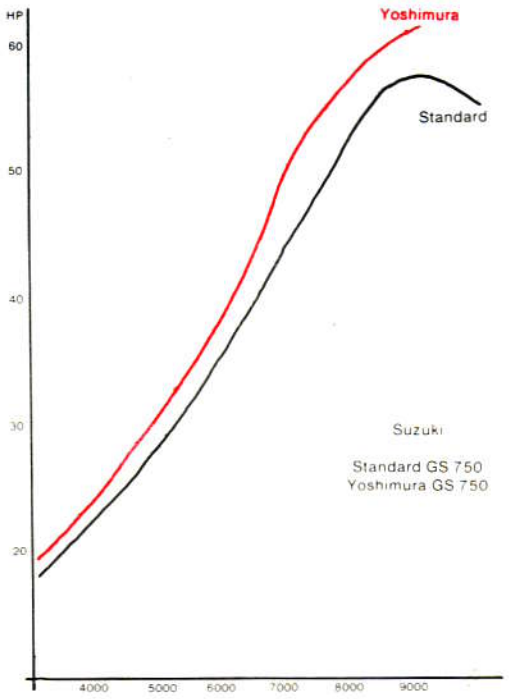

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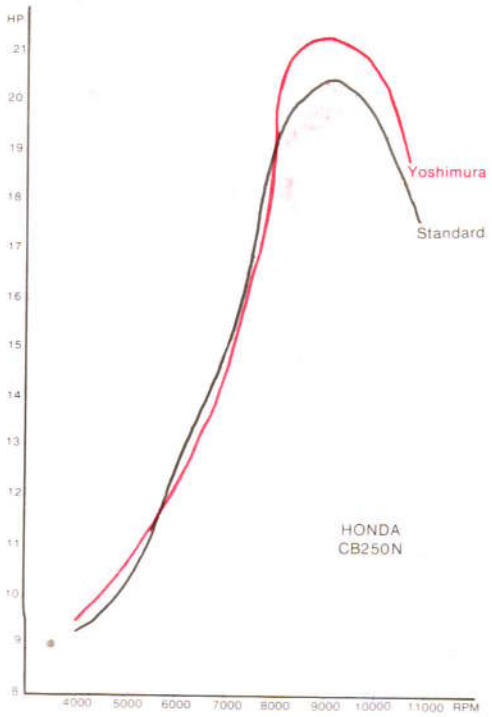
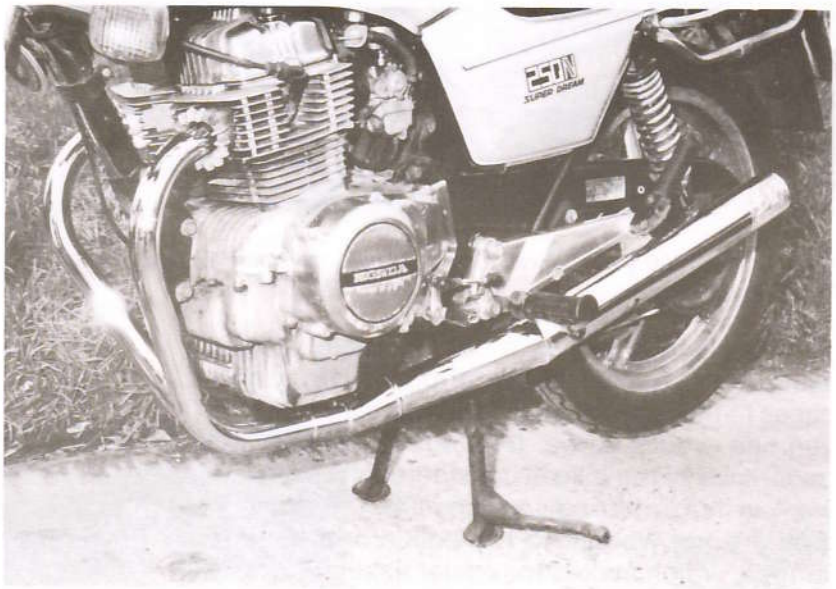
YOSHIMURA *exhaust systems*



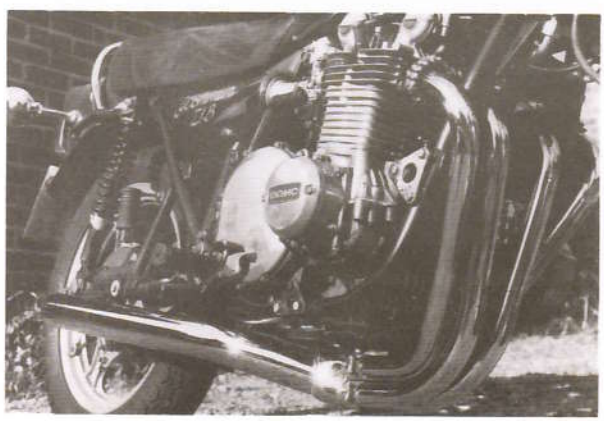
Power curve of CB250N 2 in 1 compared with stock system.

Virtually all Japanese standard four cylinder exhausts have the primary pipes constructed of a double skin, i.e. one tube within another, to avoid the traditional discolouring around the exhaust ports. However, this is an expensive method of construction and uneconomic to reproduce in the U.K. Therefore, some engines which have either been incorrectly jetted, or are running hot - for whatever reasons - may discolour the primary pipes around the exhaust port. This is quite normal, and can be seen on even the most expensive Continental machines using single-skin exhaust pipe construction. It in no way reflects upon the quality of the chrome plating. Many early Yoshimura systems are still in use without either rust or discolouration.



The system on a 250N. No rejetting required

Please do not ask for single-cylinder performance pipes; yes, they *can* be made, but the problem of keeping them acceptably quiet, whilst retaining performance, would entail an expensive product no cheaper than the manufacturer's original ! However, we do a selection of tailpipe mufflers which clamp onto the tailpipe of cross-country bikes to deaden exhaust noise, but they are no substitute for the manufacturer's original silencer. Two tailpipe mufflers joined together, will certainly take the edge off the exhaust, but only for competition use - *definitely not for street!*



Kawasaki Z1000 is a very popular 4 in 1 system - fits all models up to "J" (also Z900). There is also a system for the Z650.

YOSHIMURA exhaust systems

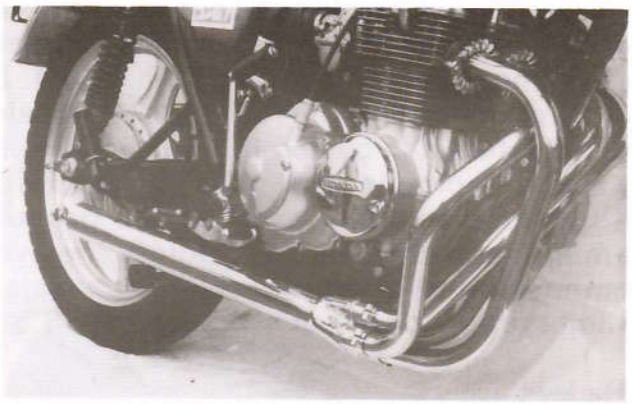
YOSHIMURA EXHAUST PIPE CENTRES: A couple of years after starting manufacture of Yoshimura systems in the U.K. demand was such that the motorcycle trade bought an ever-increasing number of systems. Back-up information was provided, supplies of oversize jets were imported from Japan, and eventually it was decided that as the systems were becoming so popular to uprate the business to a more professional level. The result was the Yoshimura Exhaust Pipe Centres, launched early in 1981. These are businesses run by fellow-enthusiasts known to us and whose aim is the same as ours, i.e. to provide you, our customer, with the best possible service.

Each centre is obliged to carry a full stock of Yoshimura systems, provide you with whatever information you require on fitting and re-jetting, and anything which the Centre staff require they can reach us by telephone for a swift response on our 24-hour telephone answering service.

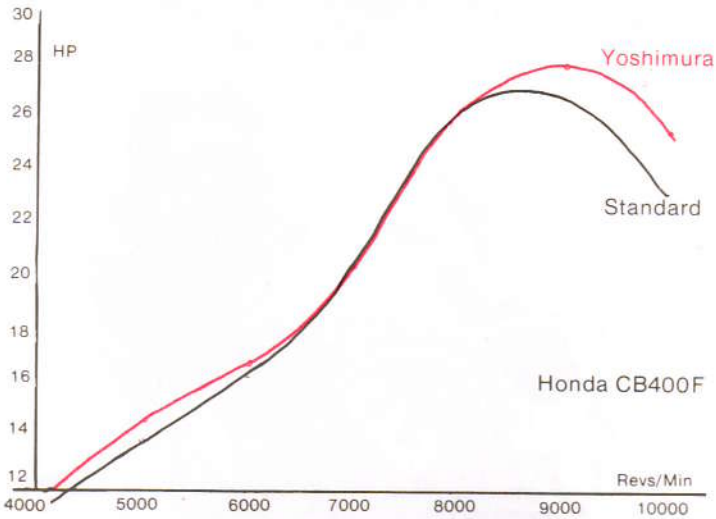
Although we welcome you buying a Yoshimura exhaust system directly from us, it may not always be convenient for you, and so the Centres are strategically-placed throughout the country so that, eventually, there should be a Centre reasonably close to you (at the time this manual went to print the number of Centres was approaching 30).

We also get valuable feedback from the Centres. They advise us of your needs, and - where possible - we try and meet these needs. For instance, if there is sufficient demand for a system which is not already included in the Yoshimura programme, then - with Yoshimura's agreement - we will develop and market it. The programme is not only being constantly updated, but so are existing designs. For instance, if during prototype development of a new system we discover a more efficient way of making the exhaust, or improving performance, then these developments will be incorporated in the next batch of all systems. This has led to as many as four different versions of the same exhaust, each one being an improvement upon the last!

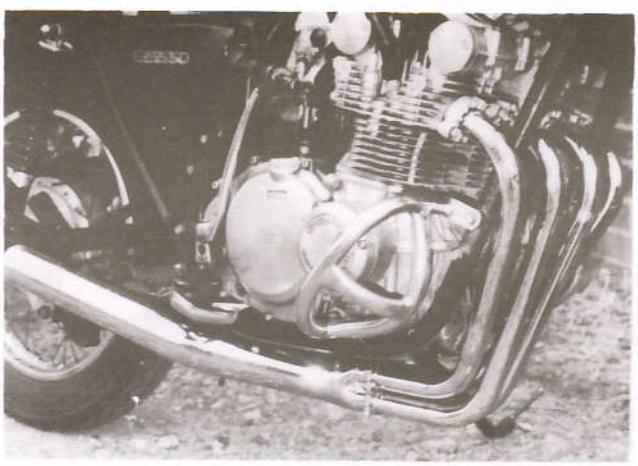
The one thing we will *not* do, and for which we are occasionally criticised, is to make a louder exhaust. You may not be aware, but non-standard exhaust systems have been banned in other countries mainly on the score of noise. We feel it to be totally irresponsible for manufacturers to make illegally-noisy pipes and, through our trade organisation SAM (the Specialist Accessory Manufacturers group, which is part of the Motor Cycle Association of Great Britain) are making every effort to have makers of illegally-noisy exhausts brought into line with the law.



Above: CB400F is still one of the more popular systems.



Power curve on stock engine, major benefit is felt with engine conversion.



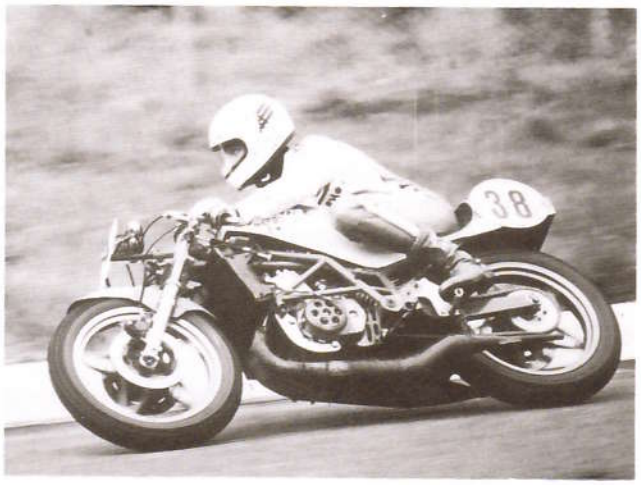
GS550 system provides not only neat appearance, but power!

COMPLETE RANGE OF SYSTEMS SHOWN ON PRICE LISTS

bimota

Generally acknowledged as the world's finest "Cafe Racer," Bimota differs from most contemporaries in one significant respect; Bimota designs have been evolved from an active engagement in racing since 1974. Based in the Adriatic seaside resort of Rimini, the Bimota factory was founded by Massimo Tamburini and Giuseppe Morri through a mutual interest in customising CB750 Hondas. (Those early Bimota parts were imported by Dixon Racing in 1975). So effective were the customising results that Bimota went into chassis-building and in 1974 produced an attractively-designed and functional Yamaha race chassis. This caught the eye of the Italian Suzuki importers who in 1975 commissioned complete rolling chassis for a batch of 500cc water-cooled racers, which made a debut at the Milan 1975 Show.

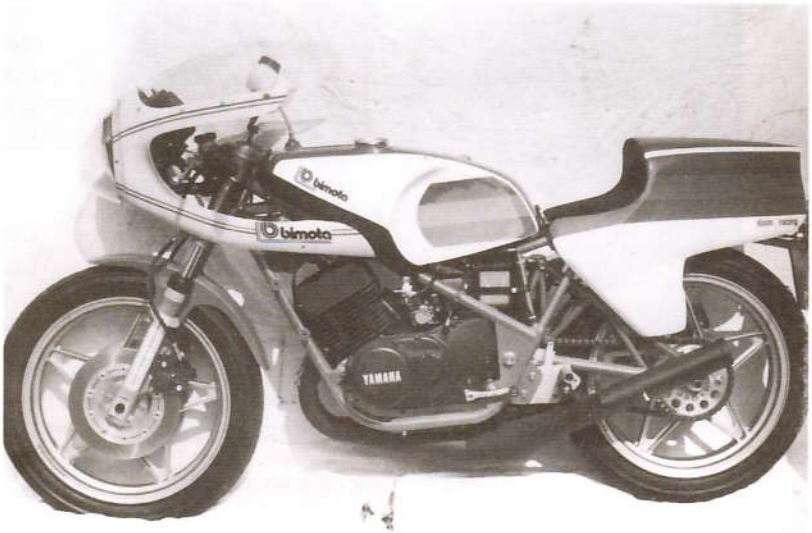
Harley-Davidson, who by that time owned Aermacchi, commissioned Bimota to supply the rolling chassis for their prototype 500cc (four carburettor) twin cylinder racer in 1976, in addition to their twin-cylinder factory racers. Bimota also built the chassis on which Johhny Ceccotto won the 350cc 1976 World Championship (and four years later they were to win back that title with Jon Ekerold).



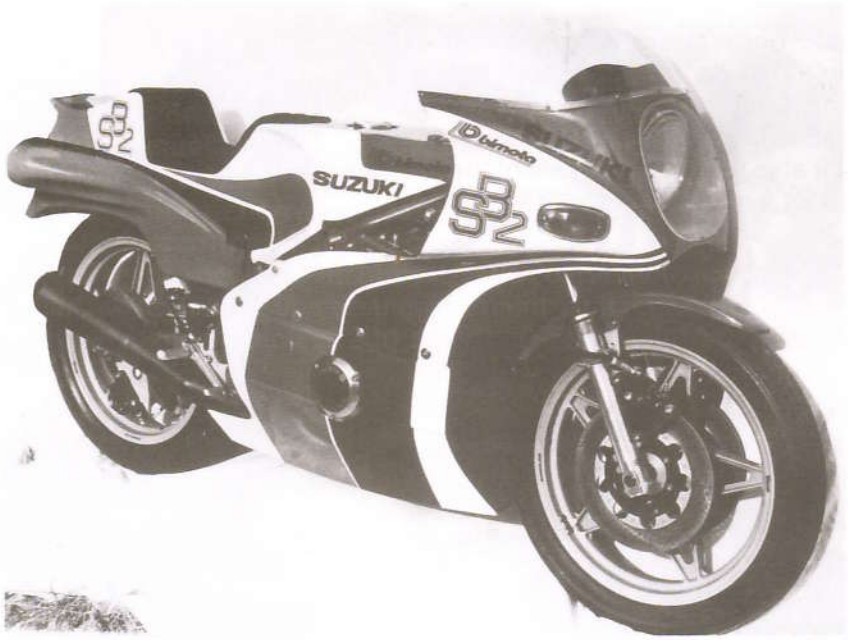
1975 Bimota-Suzuki 500cc racer with space frame, mono-shock suspension, rear fork co-axial with gear-box - features of today's bikes!

Photo by Motor Cycle Racing

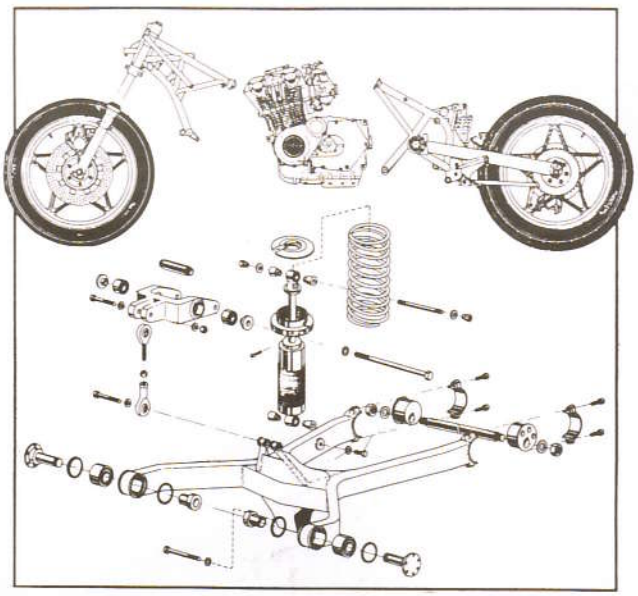
Jon Ekerold winning the 1980 350cc World Championship.



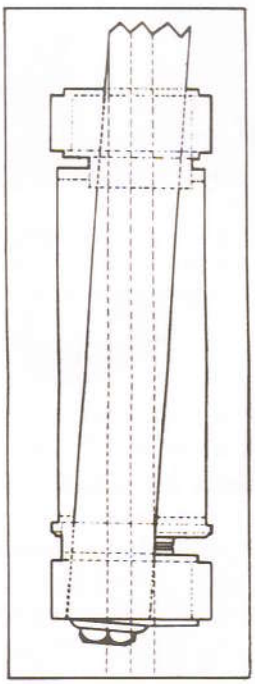
A prototype based on Ekerold's race TZ chassis, which we made for a customer. (Engine is RD400). High cost precluded production. Road holding and handling were out of this world!



First road Bimota was the SB2, introduced 1977, and in U.K. 1978. An immediate sensation it proved a knockout with press and customers alike. Expensive production methods forced it to be dropped October 1979. Clean examples now sell for more than the original - a collector's item !



Unique split frame of the SB2 is followed in its successors, the SB2/80 and SB3. Suspension is by rocker arm - Bimota first used this in 1975.

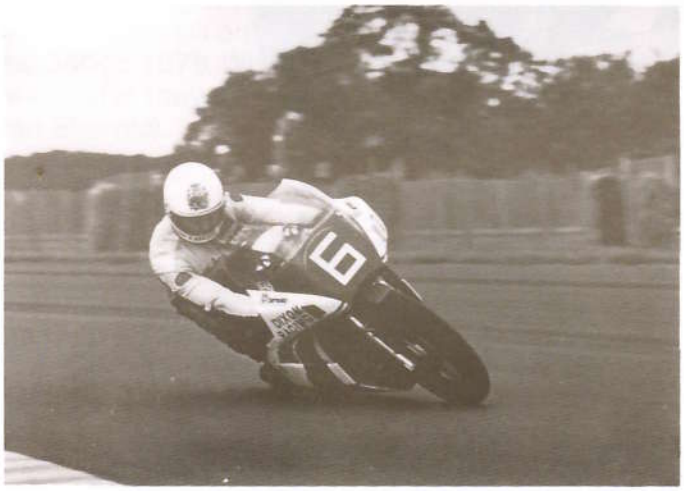


The steering head offset of SB2/3 chassis is to minimise trail alteration under severe braking.

Embodying many race-proven features of those early designs, the SB2 chassis for the Suzuki GS750 made its debut at the 1977 Bologna Show and was imported to the U.K. in January 1978 by Dixon Racing. The first roadster chassis from Bimota, it was a sensation not only in Bologna but London and the Paris Show. Changed only in detail, it remained in production until Autumn 1979, when the SB3 chassis for the GS1000 was introduced. Different in detail only, the SB3 chassis shares the same technical features, such as a main frame which splits to allow the front end be removed (for easy engine access), a box-section rear fork pivoting co-axially with the gearbox sprocket (to ensure constant rear chain tension) and controlled by a bell-crank-operated monoshock unit. Front fork legs offset from the steering head axis compensate for alteration of trail during fork movement; magnesium wheels are fitted with Brembo brakes.

The major difference between the SB2 and SB3 is in styling, the earlier model having a futuristic one-piece glass-fibre body and a fairing which enclosed the rider's hands. Cost forced the abandonment of the body, a simpler structure being used on the SB3. The fairing design is now more orthodox and it also formed the basis of the SB2/80, introduced as a successor for the SB2.

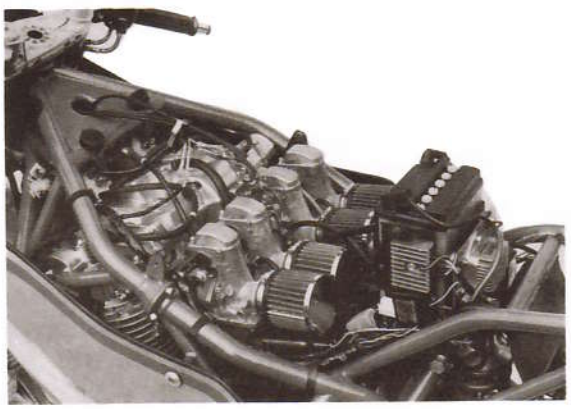
Successor to the SB2 is the SB2/80. It uses the same frame, but styling and glassfibre are different - jacket and model extra !



Bill Smith in action at Silverstone (1978) on a Yoshimura powered 944cc SB2. It lapped I o M T.T. course at 105.5mph from standing start, was later timed at 168mph in Ulster G.P.

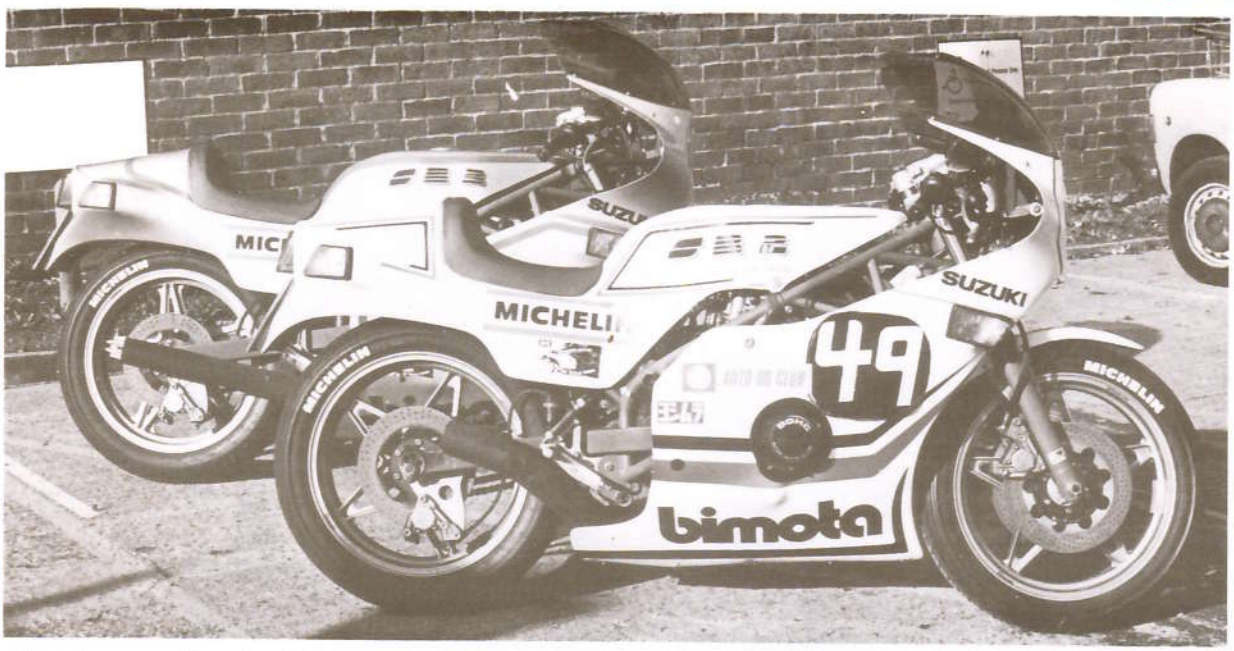
Just how good the standard of steering, road holding and braking is may be gauged by Bill Smith's fifth-place standing start lap at 105.5 m.p.h. in the 1978 Formula 1 T.T. (He retired on lap two with a broken experimental camchain tensioner). Later, the same 944cc Yoshimura-powered bike was timed at 168 m.p.h. in the Ulster G.P. - and it remained the fastest timed Formula 1 bike for two further years! Then in his 25th racing year, Bill confessed he had never ridden anything so quick, estimating his T.T. maximum speed to be over 175 m.p.h. which led to him nick-naming the bike "Whispering Death!"

A further demonstration of Bimota high-speed stability was given in October 1980 when six U.K. National Pro-Street records were made by rider Alex Heal at Elvington, Yorkshire. Even in excess



SB3 top removed for easy engine access (K & N Filters are optional extra). Petrol tank sits above engine.

bimota



The Elvington record breakers! Between them, these Yoshimura-powered Bimotas (SB3 rear, 2/80 front) made 6 U.K. records.

of 160 m.p.h. Alex reported the steering to be absolutely "rock steady". Behind the fairing he had so little impression of speed that he unthinkingly sat up at the end of a 160-plus run and, to quote him, "almost had my head blown off in the draught!"

The long-awaited Kawasaki chassis, the KB1/A, was introduced in Winter 1978. Designed for the Z-900/1000 range, this is a totally different layout from the SB2, featuring a more orthodox mono-shock layout with the suspension unit located beneath the seat and petrol tank. The frame does not split (as in the SB2/3), and a dual seat is an optional extra - unlike the chauvinistically-inspired SB2/3 single-seater. The Campagnolo magnesium wheels are fitted with Brembo brakes; front fork is Marzocchi.

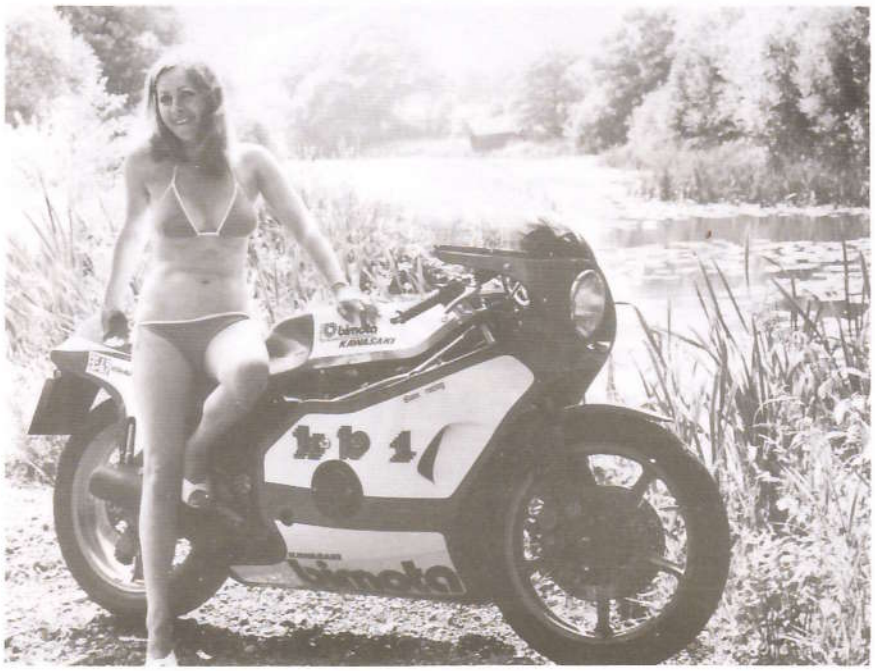
HOLDER
6
U.K.
RECORDS
bimota

Bimota road chassis are offered with a choice of standard or Yoshimura-tuned engines. As the specifications are frequently updated, details are shown separately.

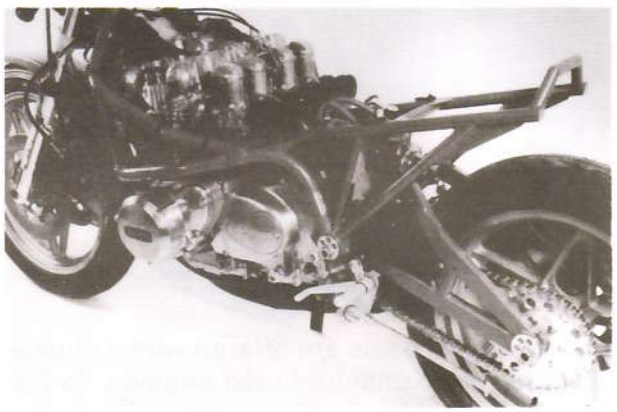
Narrow frontal area protects rider - when his knee is in !

SB3 GS1000 Suzuki chassis has indicators blended into fairing - finish is silver.

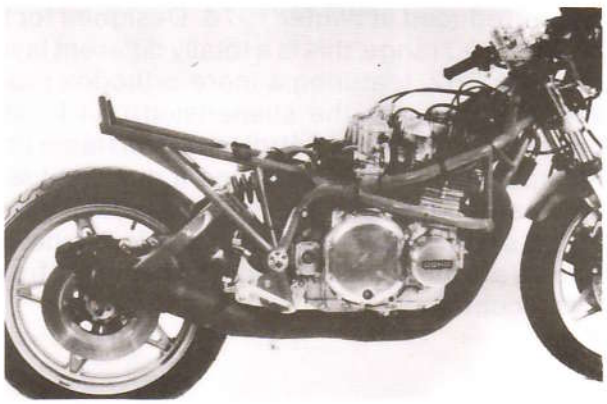
bimota



The KB1/A in rural Surrey.



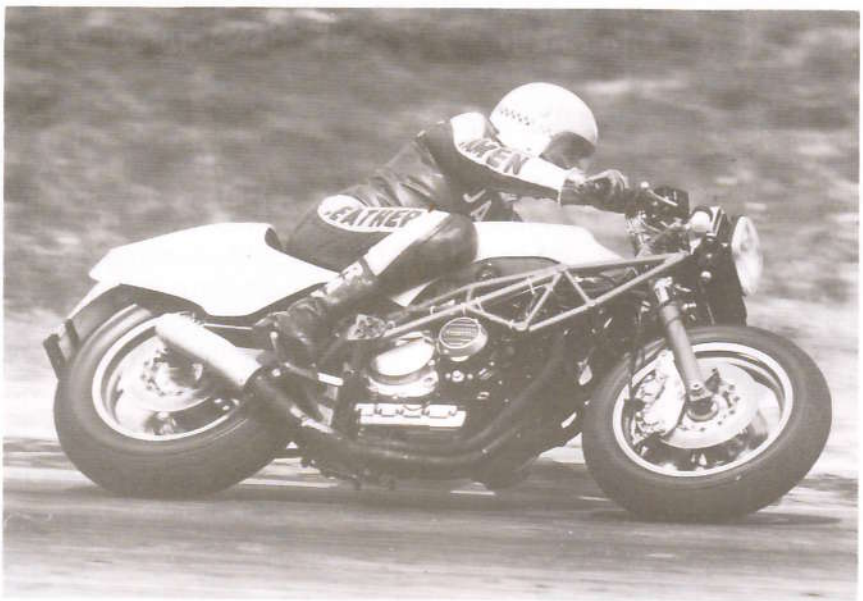
KB1/A naked, showing cantilever rear suspension. Both the spring and hydraulic damping are adjustable.



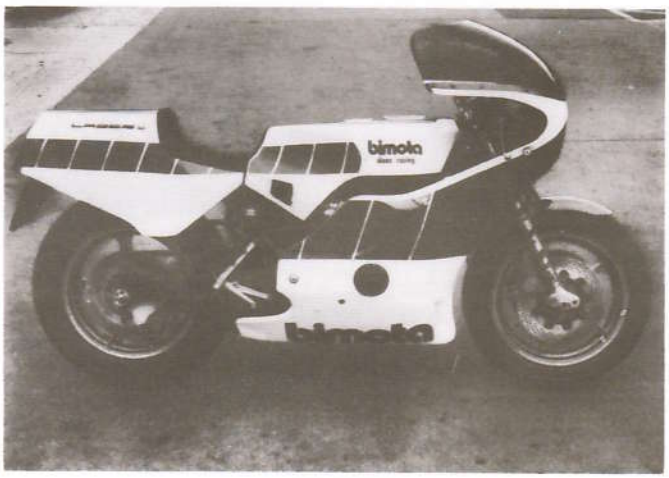
The engine is hung beneath the KB1/A frame, attached at front and rear. Exhaust comes with chassis.

At the Bimota factory in Rimini David Dixon (centre) meets designer Massimo Tamburini (left) and his partner, Giuseppe Morri (right), marketing director.

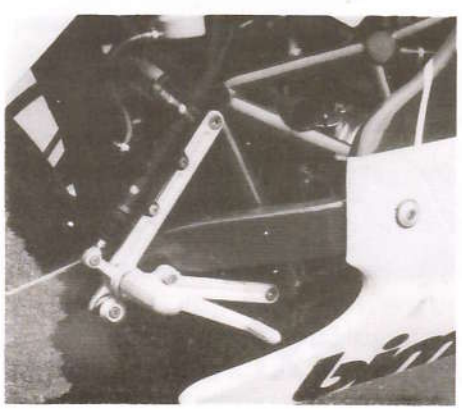
bimota



Above: Prototype KB2 being tested by Jack Findlay. Steering head is "inside" frame. Wheels are 16in. and entire bike is super-compact.



The KB2 in all its glory! Accent is on low weight and super handling; excellent aerodynamics give high top speeds. Engine is Kawasaki Z - 550; race version may be available.



Details of the KB2: Left: Close-up of rear brake pedal and slim master cylinder. Right: Slim lines are well shown in this rear view: rider can tuck in completely behind fairing.

bimota

SPECIFICATIONS:

KB1/A

Wheelbase, 55ins; seat height, 30ins; overall height (to top of steering head), 36ins; overall length, 84ins; overall width (handlebar ends), 27ins; weight of rolling chassis (without engine), 191lbs; complete with engine and electrics (but without petrol or oil), 440lbs; petrol tank capacity, 3½gallons (including reserve).

KB2

Wheelbase, 54ins; seat height, 28ins; overall height (to top of steering head), 34ins; overall length, 81ins; overall width (handlebar ends), 25ins; weight complete with engine and electrics (but without petrol or oil), 360lbs; petrol tank capacity, 3½gallons (including reserve).

SB3

Wheelbase, 55ins; seat height, 28ins; overall height (to top of steering head) 36ins; overall length, 84ins; overall width (handlebar ends) 27ins; weight of rolling chassis (without engine), 183lbs; complete with engine and electrics(but without petrol or oil), 460lbs; petrol tank capacity, 3½gallons (including reserve).

SB2/80

Similar to SB3, but chassis is ¾in shorter, total machine 5lbs lighter.

BIMOTA PRESS COVERAGE .....

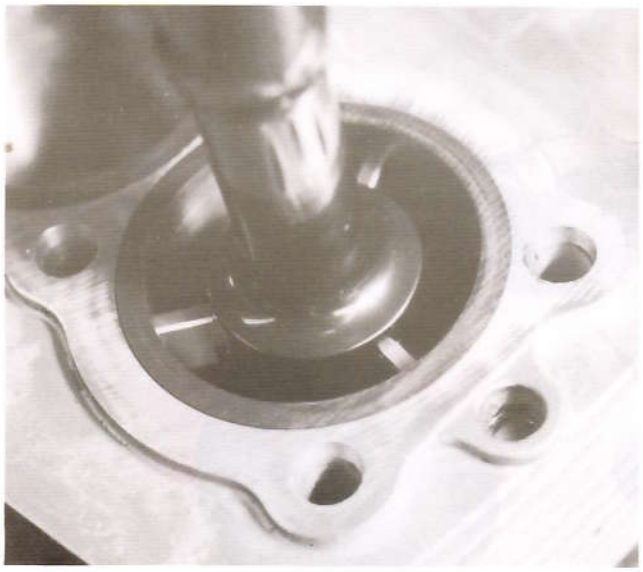
.....HAS BEEN EXCELLENT

Our Workshop Facilities

It will be obvious from the foregoing that we strip and rebuild engines to fit tuning parts. And it will also be obvious that at no time have we mentioned two strokes; they are too simple, and we don't see how they can work, nor do we understand how they can stop working so frequently! So we restrict our activities to the good old reliable (and some may say complicated) four-strokes. At least we understand how they operate, and just keep on working. . .

Our other facilities may be of interest and of use to you:

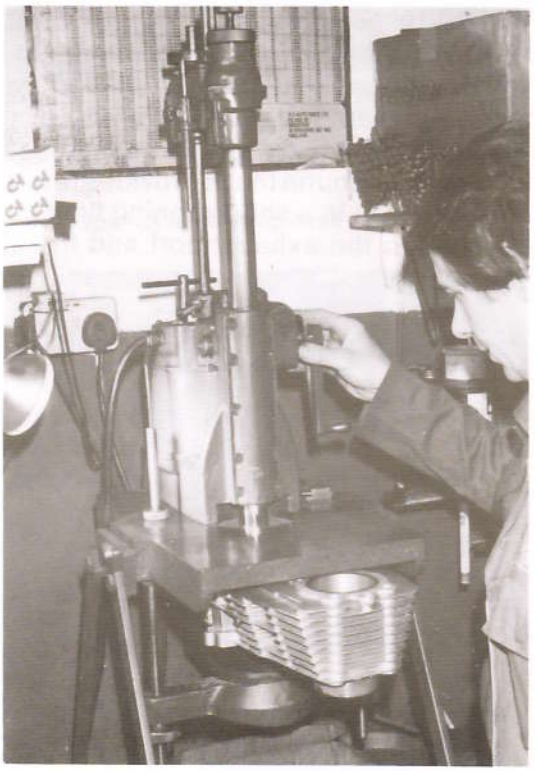
CYLINDER BORING AND HONING; some years ago we installed our own cylinder boring machine, to ensure accuracy in match-boring each of our pistons to suit its individual cylinder. The machine can handle any bore from 35mm to 87mm. We hone each cylinder to give the best operating finish, and longest life.



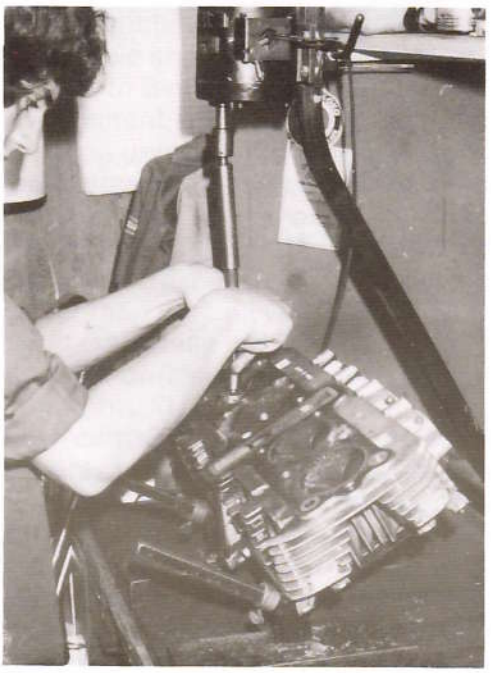
Each piston is matched to its new bore: here the bore is being precisely measured.

VALVE SEAT CUTTING; originally, to install a big valve conversion meant cutting the seats by hand. It took nearly two days to cut in a complete set of big valves in a Kawasaki! Now we use an American motor-driven cutter which reduces the time by 75%, and also provides an equally-good finish. Incidentally, it takes longer to cut-in valve seats on a Suzuki used head than on a new one (because usage hardens the Suzuki seats to a greater extent than any others).

VALVE GUIDE REPLACEMENT; as part of the full-race big-valve Suzuki and Kawasaki conversions, we also have facilities for changing valve guides, to suit the 6.6 big-valve conversions. We also offer a service for replacing Honda and Kawasaki (late type) cast iron standard valve guides with aluminium-bronze guides, which we find provide a longer life and work better with stainless steel one-piece valves.



Workshop foreman Colin Charles bores a CB900 block.

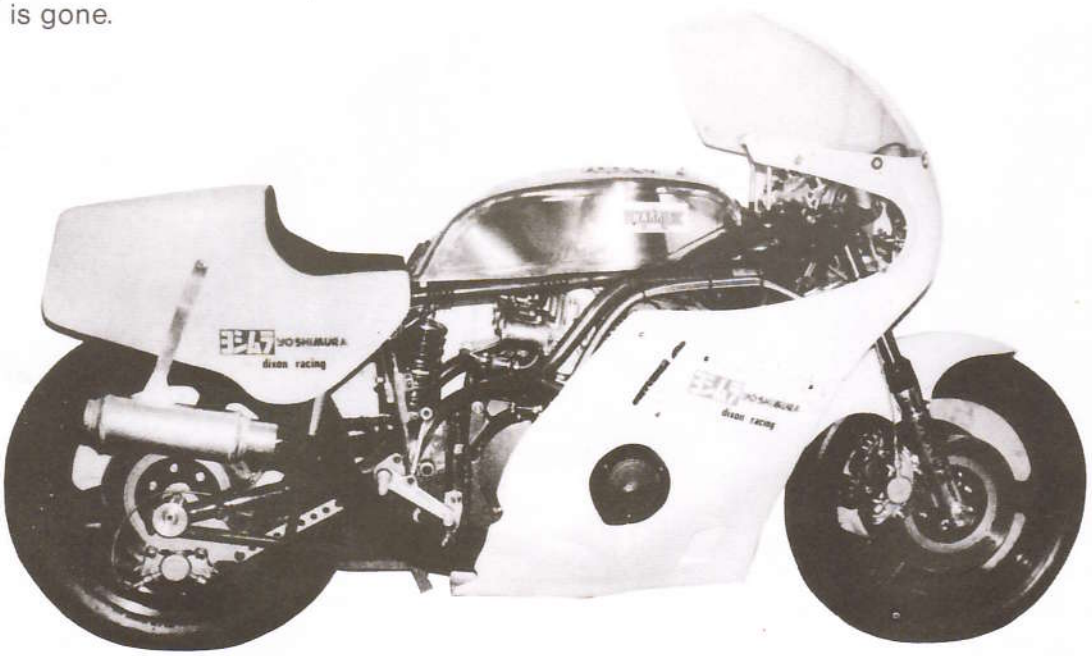


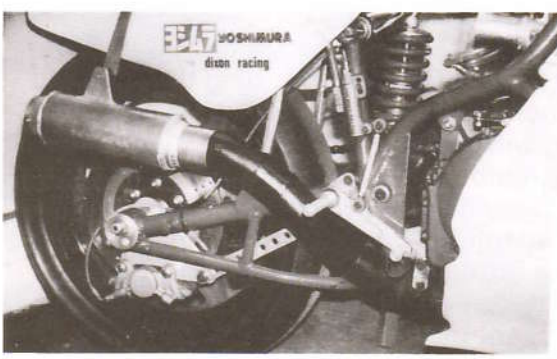
Valve seat cutting, using an American-powered cutter. Time (and cost) is saved.

Workshop

CYLINDER HEAD PORTING; there is no quick way of porting a head; we use not only the same equipment as Yoshimura (he supplies us with it) but we also execute the work in the same way, porting each head to Yoshimura's own shape. The time taken varies depending upon the head; on average a normal "port polish" takes approximately two full working days, but a full-race head, converted for big-valves and race carburettors can take up to four or even five days. (As you may imagine, it's not the most popular workshop job!). As already emphasised elsewhere, it is the *shape* which is important, rather than giving a mirror finish. A mirror finish is mainly a cosmetic job; in practice we have found that it provides few, if any, benefits because in a short running time carbon is deposited in the exhaust port and the mirror finish is gone.

Cylinder head porting is done to Yoshimura's own pattern.





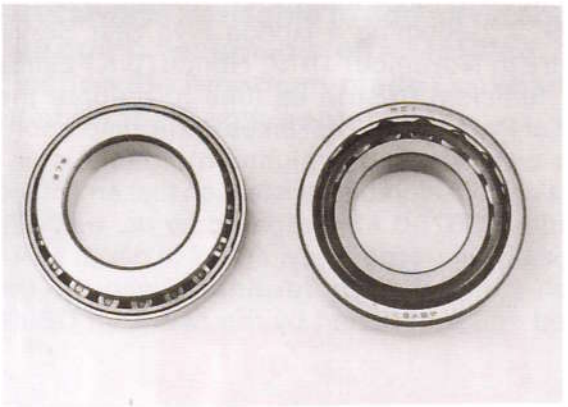
Above: Danny Shimmin's Formula 1 Harris-Suzuki with Yoshimura "works" engine. First time out, Dan was third!
Right: Close-up of rocker arm rear suspension - similar to that on Bimota SB3.

COMPLETE BIKE BUILDING; this started in 1978 with the advent of Bimotas. Into the imported Italian chassis we built either Suzuki or Kawasaki engines, to make a complete machine. Originally, we had to obtain secondhand GS750 engines, wiring harnesses had to be modified, and dozens of ancillary items had to be fitted to the Bimota to make a complete machine. (On the advent of the SB3/GS1000, we purchased brand new Suzukis to build a 100% new machine).

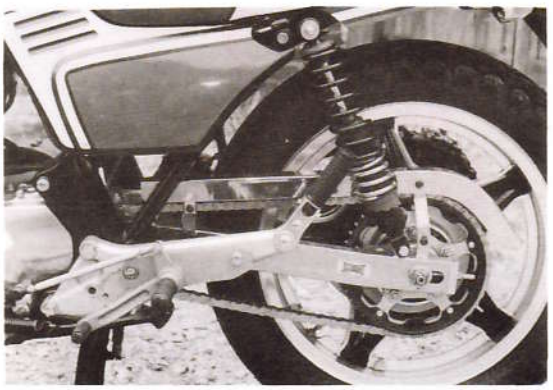
Our facilities also include building complete racing bikes, as we did with Charlie Williams' 1979 second place Formula 1 Honda. Into the Ron Williams-made Maxton chassis we converted a standard CB900 Honda engine and RSC race kit; in the process, we evolved a Krober ignition system for the CB900. First time out, the untried bike finished second (at 110 m.p.h. average) in the Island. We have since built other complete racing machines for customers.

Workshop

CHASSIS AND BRAKE MODIFICATIONS; in our earliest association with Yoshimura, we used chassis kits to strengthen the original Kawasaki 900 "wobbler" frame, then imported Bimota box-section rear forks to modify Hondas and Kawasakis, branching out into taper-roller head bearings, and front and rear suspension modifications incorporating S & W fork and rear damper units. Over the years, we have also provided twin disc brake kits for Hondas, modified existing discs by slotting or drilling, and replaced standard rubber brake hoses with Aeroquip steel-braided piping, which we have found very effective on race machines. We still fit box-section rear forks (on standard bikes), taper-roller head bearings and, of course, lots of Yoshimura pipes!



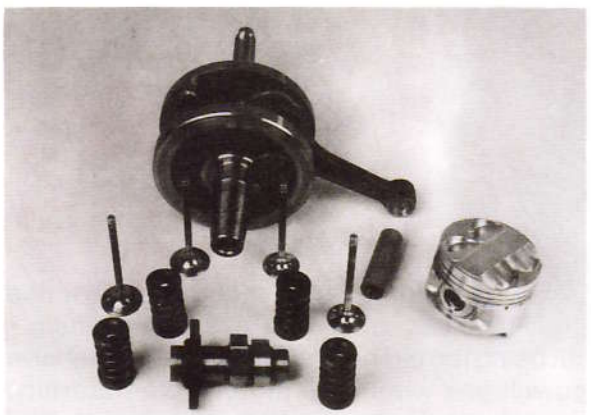
Taper-roller steering head conversion.



Some rear-end modifications to a Honda CB900; Box section fork, rear sets, S & W "Street Stroker" shocks, chrome chainguard, Tsubaki self-lube replacement chain and Dunlop tyres.

S&W

TSUBAKI



Experimental engine kit for Bill Pye's 250 Honda XLS grasstrack engine; our cam, modified rod, 74mm high-compression piston and oversize race valves and S & W springs.

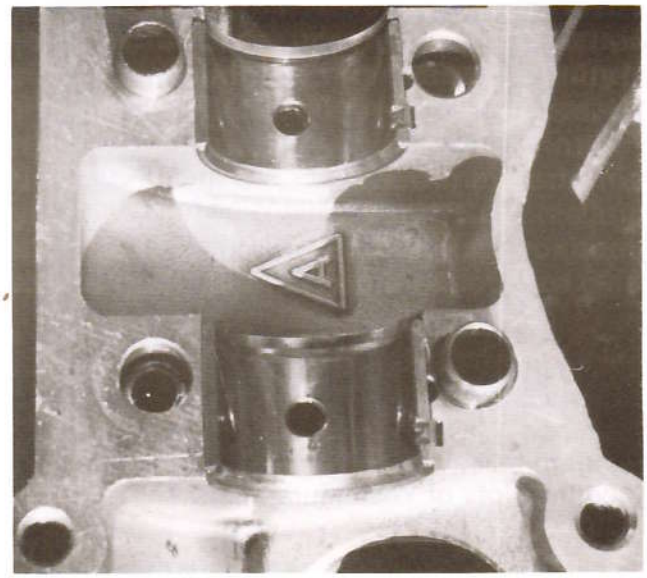
RESEARCH AND DEVELOPMENT; we are constantly searching for, and developing, new ideas to improve engines and chassis (hence our association with Bimota). As a result of our CB900 race development, we evolved our own camshaft design in conjunction with the late, and great, American camshaft designer, Kenny Harman. Coupled with the Yoshimura 4 in 1 exhaust, Dellorto carburettors, this cam and 996cc piston kit have produced a road going engine developing more power than the unit which Charlie Williams raced so successfully in 1979!

Our association (since 1974) with Yorkshireman Bill Pye and his XL Hondas has resulted in Bill winning over 400 grasstrack races. We discovered with those Hondas ways of improving power that even surprised Pops! (Bill is still being asked to strip his engines for measurement to ensure they are not oversize!).

The annual bill for our dyno-development time now exceeds the total turnover of our entire business in its first year! But it's money well spent, as one can never know enough - and there's always something new to learn!

Workshop

HONDA SALES AND SERVICE; we were appointed a Honda Main Agent from our inception in 1973, becoming a Honda Five Star Service Centre in November 1977. Honda (U.K.) Limited had sufficient trust in us then to prepare their fleet of Press Road Test bikes until completion of their own workshops eighteen months later. It gives us considerable satisfaction that an unfaired standard CB750 F2, prepared by us, was electronically timed (one way) at 127 m.p.h. at MIRA - which compares very favourably with the best speed so far obtained by the twin cam CB900.



To save friction (and gain more power) we bushed the cam bearings of our own F1 Suzuki engine. Shells used are readily available; (customer conversions are also done).

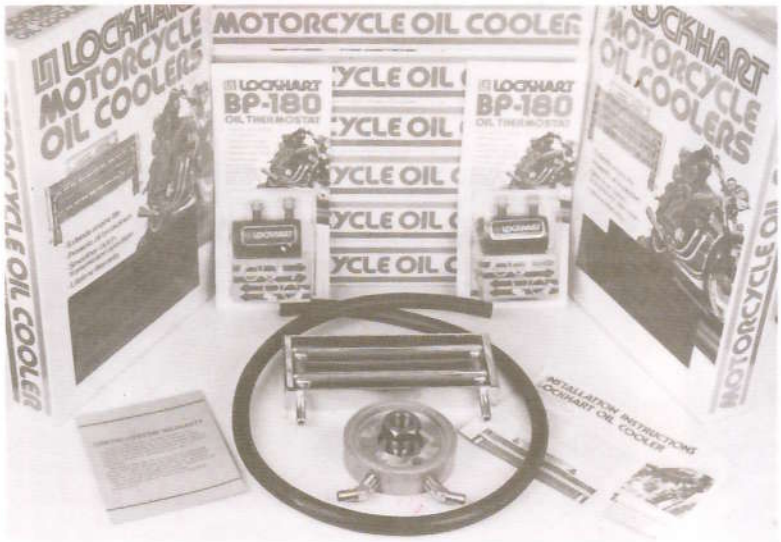
Our Yoshimura and Bimota technicians also double-up on Honda servicing when necessary. It may be a coincidence that we seem to service most of the multi-cylinder bikes within our area - even though there are fourteen other motorcycle shops within ten miles. Other regular customers come from not only the South East of England but from Wales and the far North.

Diagnostic wizardry saves time (and customer's money !) in tracing electrical problems - also ensures spot-on accuracy during servicing.

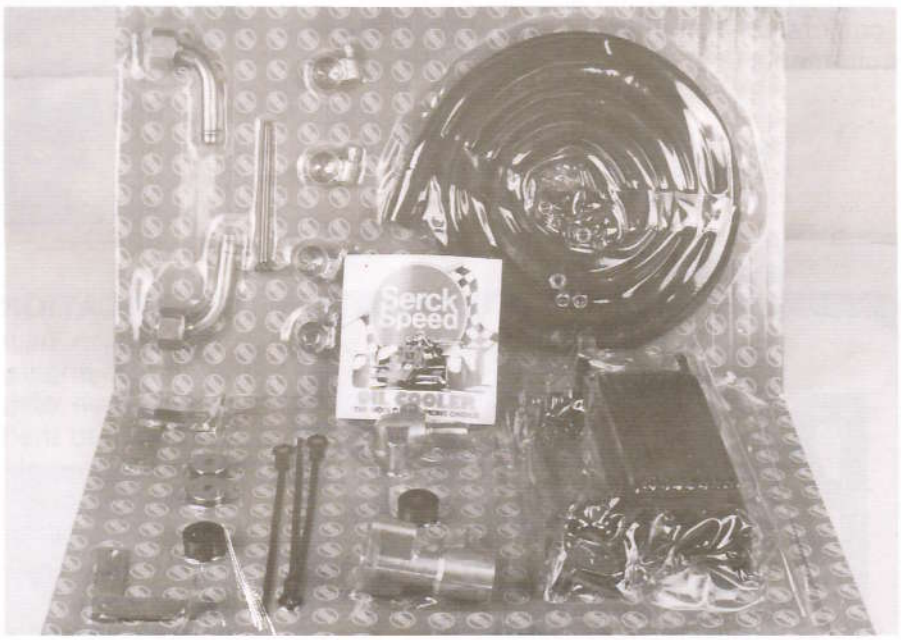
So, it seems a fair chance that our experience and facilities can offer you a service which - without being too big-headed! - is as comprehensive as you will find within the motorcycle fraternity. We are only a telephone call away for a solution to your problem!

OIL COOLERS

Producing energy also produces heat, and producing more power requires cooling the engine. If reliability is to be maintained then it is always advisable to add an oil cooler to a converted engine, especially if a big-bore, high compression, piston kit is fitted. For many years Yoshimura has included in his specification the American-made Lockhart oil cooler systems, to which we have added the British-made Serck coolers.



Lockhart (USA) offer a wide range of coolers for most four strokes. They come as a bolt-on kit with full instructions.



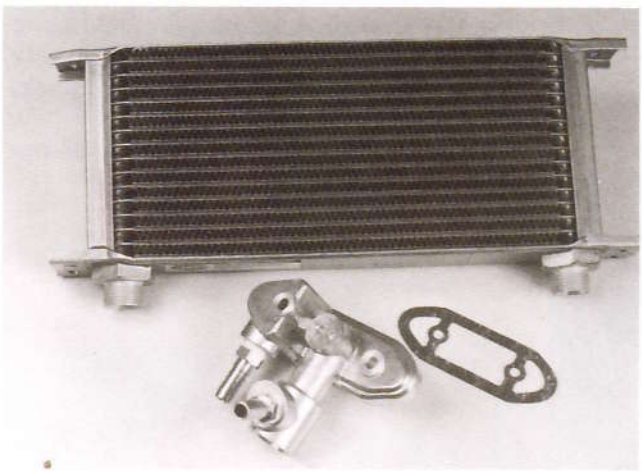
Serck offer an ever-widening range, "bubble-packed", for bolting on. Prices are usually less than Lockhart (Serck are U.K. made).

Using a combination of Lockhart and Serck kits we can offer the widest possible choice of coolers, whether for road or competition use. The Lockhart range is the most extensive, covering not only engines that Yoshimura converts but many others as well, which can be useful for the long distance touring rider who has a fairing, and feels that his engine would benefit by better cooling.

For the competition rider, Serck produce some superb large-capacity coolers which we find

Oil Coolers

invaluable on Formula 1 full-race engines. Both manufacturers also include thermostats which allow the engine reach its normal working temperature in very cold weather before the thermostat allows the oil to circulate via the cooling radiator.



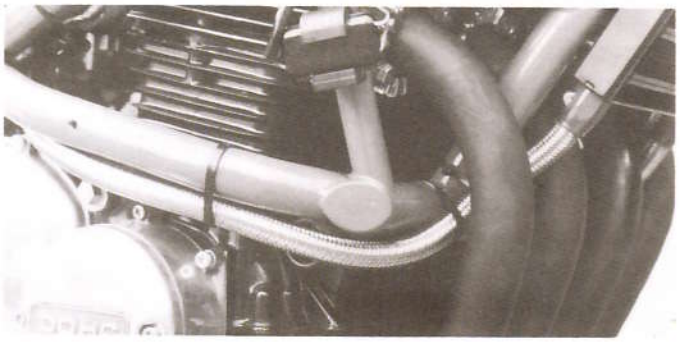
For the 1,000cc Suzuki engine, Yoshimura has made a neat aluminium casting which bolts into the position normally occupied by the oil pressure switch at the rear of the crankcase. The flow and return pick-ups are in this casting.

If you have a specialist need please do not hesitate to contact us as I am sure we will be able to conjure up something to meet your cooling requirements !

Serck Speed

Left: Serck "super-cooler" for racing: this is the one favoured by most Formula 1 teams. Yoshimura-Suzuki bolt-on adapter alongside.

Aeroquip



Right: Aeroquip steel braided oil pipe is favoured by racers - it withstands heat and very high pressures.

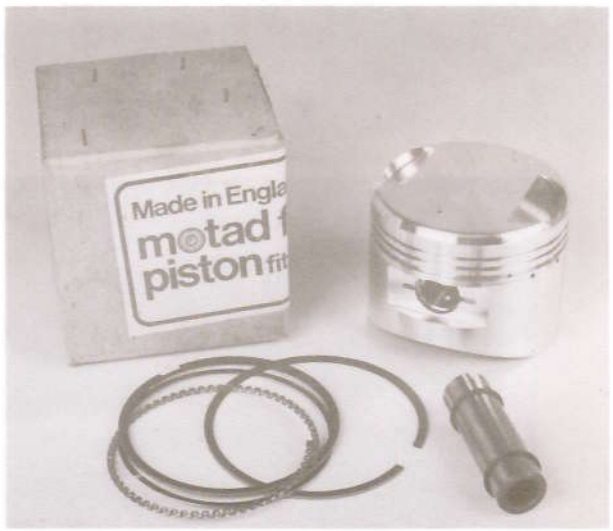
BEL-RAY
TOTAL PERFORMANCE LUBRICANTS

LUBRICATION : remembering that a converted engine usually runs slightly hotter than a standard engine (how much hotter depends on the degree of tune), you should pay particular attention to the type, and viscosity (thickness) of oil used. One which is suited for a standard engine may not be able to cope with increased pressures; this will lead to overheating, increased wear (especially of valve gear) and - in extreme cases - seizure.

We set up most converted engines on Bel-Ray 20 - 50 synthetic oil as we have found it to run cooler, cleaner and be more reliable than any other brand. In full-race engines, we use either a "straight" SAE30 or 40 Bel-Ray Racer oil. The slightly-higher cost is more than offset by the savings in reduced wear and greater reliability !

Our Specialities

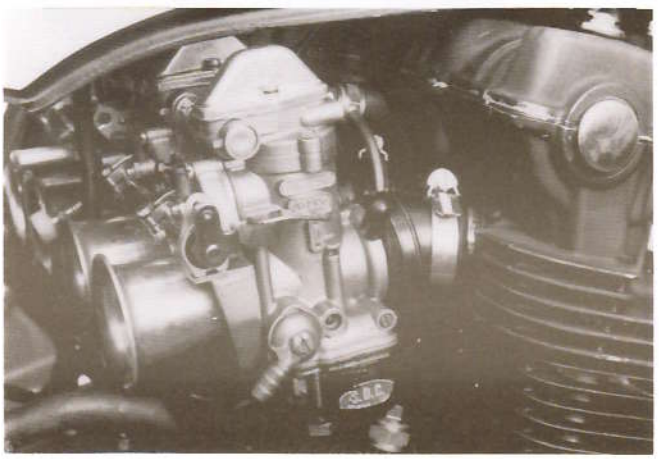
Over the years we have built up a range of equipment which we call our "specialities." Many of these bits and pieces are exclusive to Dixon Racing, having their origin in the specialist nature of our particular business. They are wide ranging; clutch springs, paddock jackets, footrest kits, camera bags, timing discs, key fobs - there's something for everyone! On this and the following pages, we illustrate some of the items (a complete list is available separately - it's constantly being updated, so make sure you have the latest).



High-compression piston kit for the XT500 Yamaha; is forged, made in U.K., and works a treat!

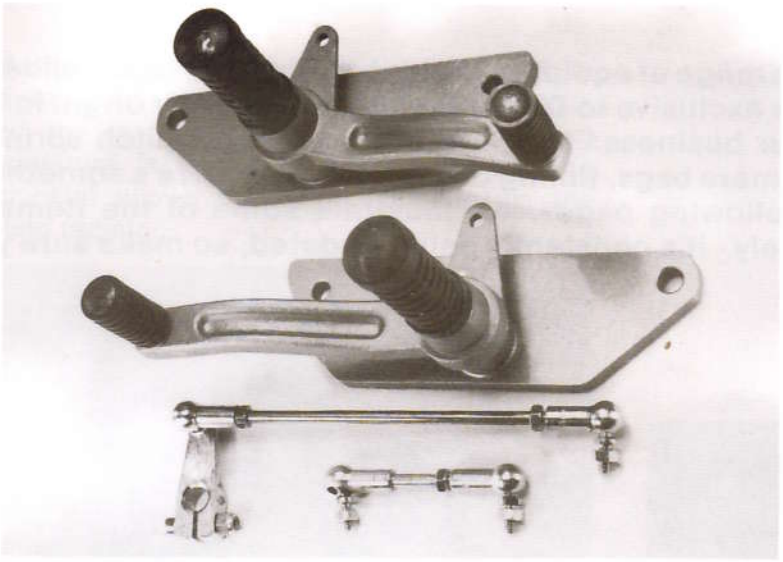
Still selling well after nearly 10 yrs. are these Honda heavy-duty clutch springs. Another conversion is available for the GS1000 Suzuki.

Dellorto carburetor kit on our CB900 Honda; the conversion gives more power through the range - especially in the middle.



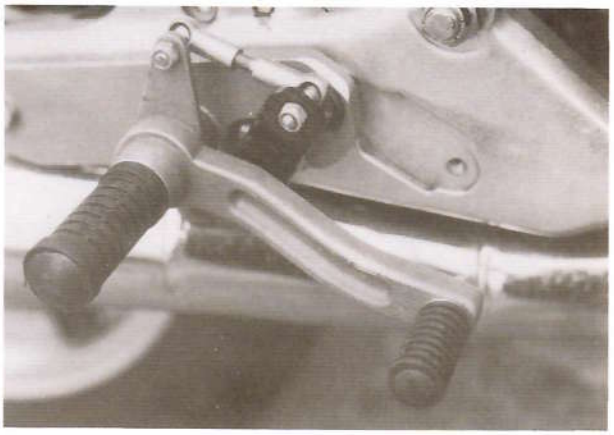
We sold hundreds of 305cc conversions for the old "motosport" XL250 Honda - now replaced by the XL250S. Here is the 305cc kit for that model.

Specialities



We import a large range of Italian cast-alloy rear-set footrests - to fit most Honda twins and fours, Suzuki and Kawasaki fours, etc.

bimota *clip-ons fit 38mm diameter fork legs; have vertical, as well are fore/aft. adjustment.*



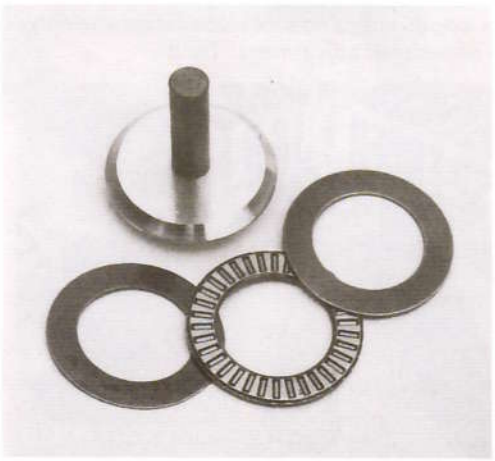
Close-up of rear brake pedal on CB900 Honda.

Having your own vacuum gauges, can save you service time, keep carbs spot-on.

Above: Quick-action twist grip, (approx. 90°) is mainly for racing: accepts standard push-pull cables. Drum is alloy, cannot distort.

Specialities

Left: Some folk swear by K&N air filters - others swear at them ! They work very well, but affect carburation, making it difficult to jet correctly.
Below: Simpler - and much cheaper - are these spun-alloy velocity stacks. Usually only one size bigger jet is required (except on CV carbs).



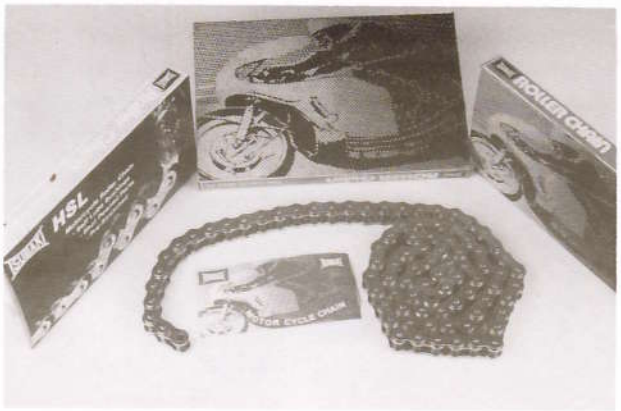
Kawasaki clutch - thrust withdrawl bearing eases full - throttle standing - starts.

GS1000 heavy-duty clutch spring kit is for competition use - inc. inner and outer springs.

Timing disc is essential for degreeing - in cams. Also contains useful formulae (some famous works teams use this disc !).

Specialities

We try to keep a good supply of bimota rear tyres !



We fit SUBAKI nickel-plated self-lube rear chain as standard equipment on Bimotas - chain looks better, lasts longer, needs no other lubrication and only occasional adjustment. Try it !.

J & R tail pipe mufflers are popular for trail bikes (or moto cross), are not for road use! Re-fill packs are available.

Scitsu electronic r.p.m. counter is self-generating, through re-chargeable (internal) battery giving approx. 3 hrs. running. It counts impulses from a plug lead, but does not interfere with ignition. Comes complete with rubber mountings.

Specialities

Pops Yoshimura paddock accessories: Left: Cotton T shirt has his picture and autograph (in English & Japanese!) on front and famous ヨシムラ on back. Jacket on right is same as Pops wears, is silver, quilted, high collar, has three pockets and is very smart!

(Sizes are small, medium, large and extra large)

Selection of decals, patches and key fobs, all available directly from us, or one of our agents.

Woven cloth patch is red and silver - stitch on.

YOSHIMURA

Specialities

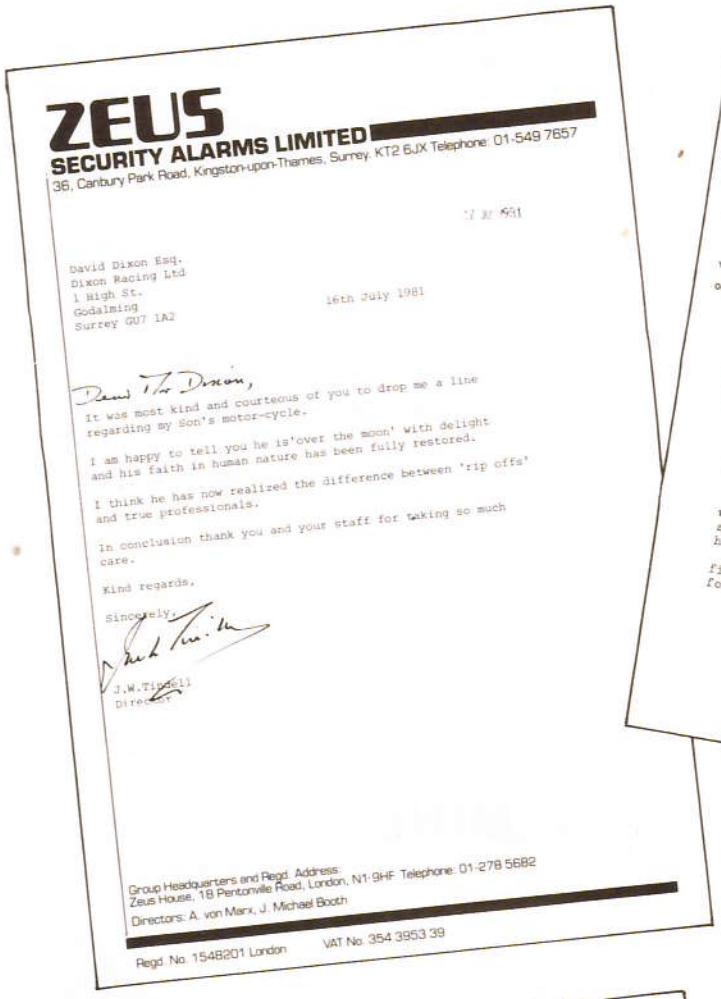
Designed specifically for motor cycling, our camera bag is moulded in plastic, is kidney shaped to fit snugly round the waist and is water and shock-resistant. It is red velour-lined and has 3 adjustable compartments.

Famous sports photographer, Don Morley, says: ".....one of the most comfortable bags I've ever used..... I thoroughly recommend it."

Welcome to our shop ! We're at your service !

You said it !

We try to provide an efficient, prompt service - and usually succeed, and some of you even thank us as you can see from these recent sample letters !



ZEUS
SECURITY ALARMS LIMITED
36, Canbury Park Road, Kingston-upon-Thames, Surrey. KT2 6JX Telephone: 01-549 7657

David Dixon Esq.
Dixon Racing Ltd
1 High St.
Godalming
Surrey GU7 1AZ

16th July 1981

Dear Mr Dixon,

It was most kind and courteous of you to drop me a line regarding my Son's motor-cycle.

I am happy to tell you he is 'over the moon' with delight and his faith in human nature has been fully restored.

I think he has now realized the difference between 'rip offs' and true professionals.

In conclusion thank you and your staff for taking so much care.

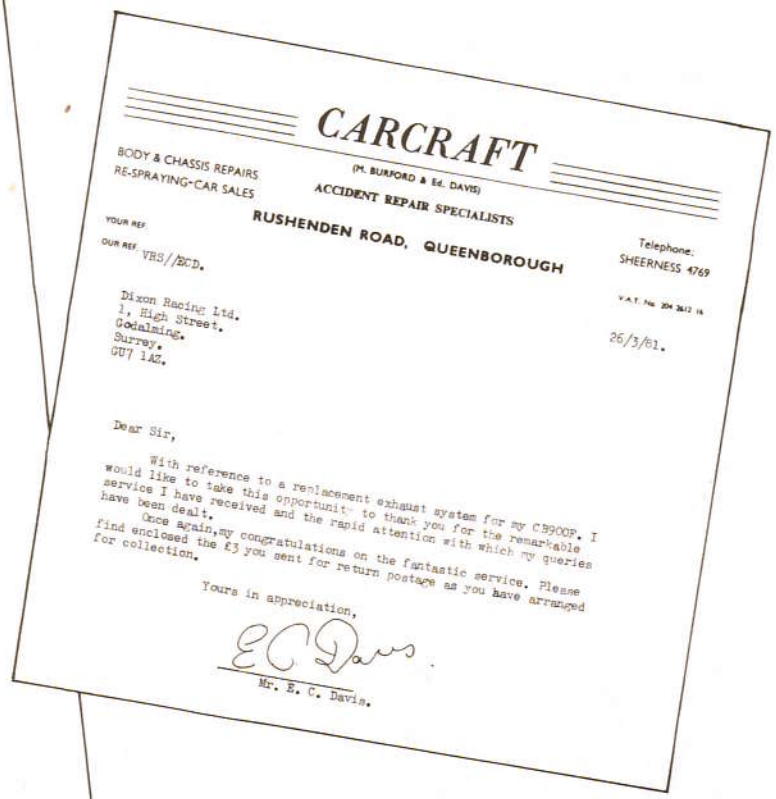
Kind regards,

Sincerely,

J.W.Tindall
Director

Group Headquarters and Regd. Address:
Zeus House, 18 Pentonville Road, London, N1 9HF Telephone: 01-278 5682
Directors: A. von Marx, J. Michael Booth

Regd. No. 1548201 London VAT No. 354 3953 39



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V.A.T. No. 204 3612 16

Dixon Racing Ltd.
1, High Street.
Godalming.
Surrey.
GU7 1AZ.

26/3/81.

Dear Sir,

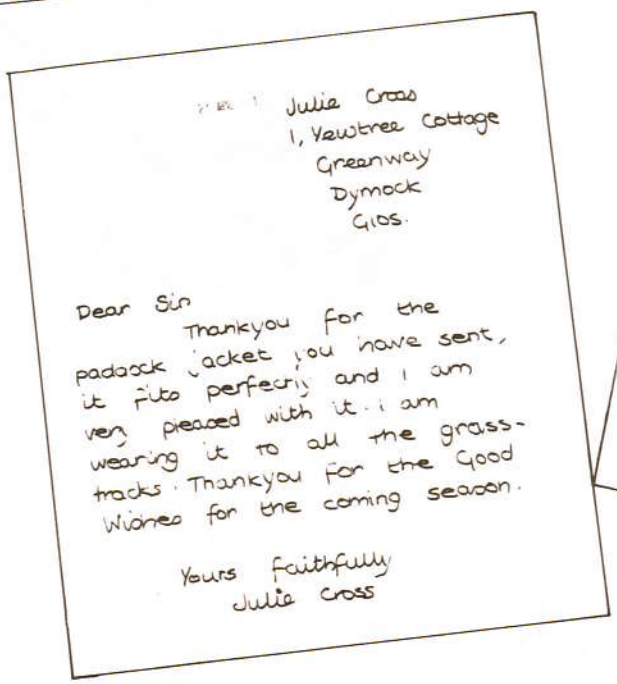
With reference to a replacement exhaust system for my C.9900F, I would like to take this opportunity to thank you for the remarkable service I have received and the rapid attention with which my queries have been dealt.

Once again, my congratulations on the fantastic service. Please find enclosed the £3 you sent for return postage as you have arranged for collection.

Yours in appreciation,

E C Davis.

Mr. E. C. Davis.

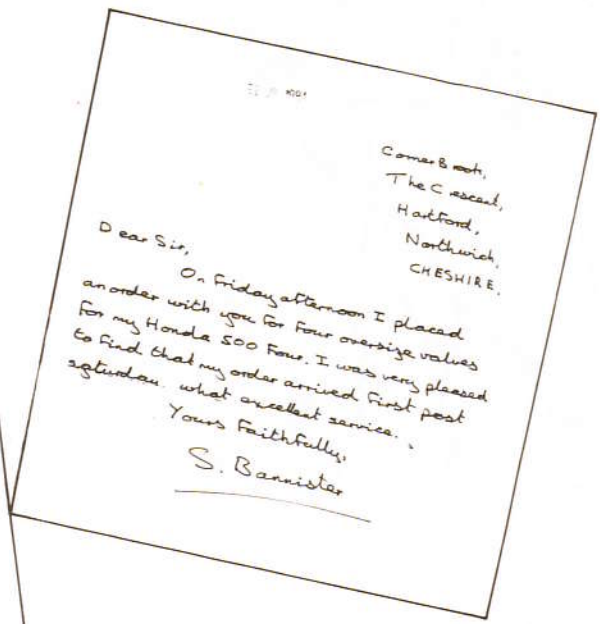


Julia Cross
1, Yewtree Cottage
Greenway
Dymock
Glos.

Dear Sir

Thankyou for the padsock jacket you have sent, it fits perfectly and I am very pleased with it. I am wearing it to all the grass-tracks. Thankyou for the Good Wishes for the coming season.

Yours faithfully
Julia Cross



Corner Cottage,
The Crescent,
Hartford,
Northwich,
CHESHIRE.

Dear Sir,

On Friday afternoon I placed an order with you for four oversize valves for my Honda 500 Four. I was very pleased to find that my order arrived first post saturday, what excellent service.

Yours Faithfully,

S. Bannister

HOURS OF BUSINESS:

Monday to Friday: 9.00 a.m. - 6.00 p.m.

Saturday: 9.00 a.m. - 5.00 p.m.

(Closed Sunday)

ORDERING: use our priority Postal Ordering form. Send cash with order; it is quicker (and cheaper in the end) to add £3.50 for 48-hour Securicor delivery (up to 22lbs).

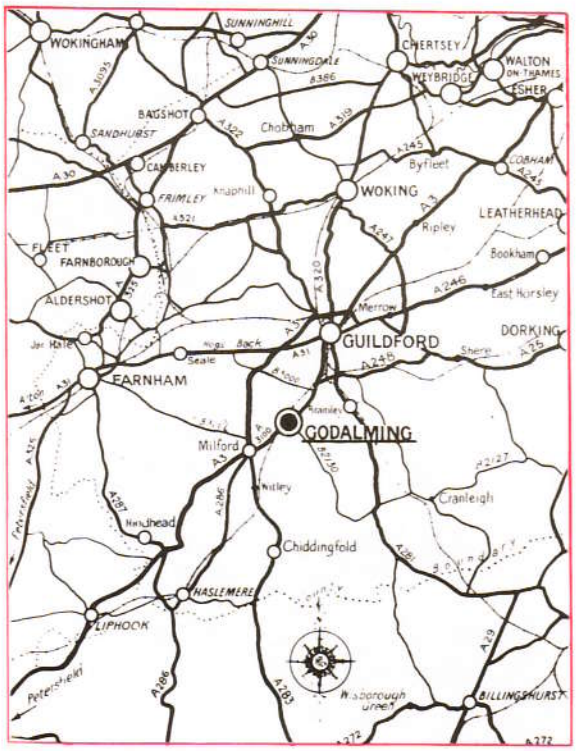
Alternatively; if in doubt, list the items you want (or use our 24-hour telephone Answering Service, 04868-28928 after 6 p.m.) and we will send you a Pro-Forma Invoice. On receipt of this, you return it with cheque, Postal Orders, Money Order - or use your Access or Barclaycard.

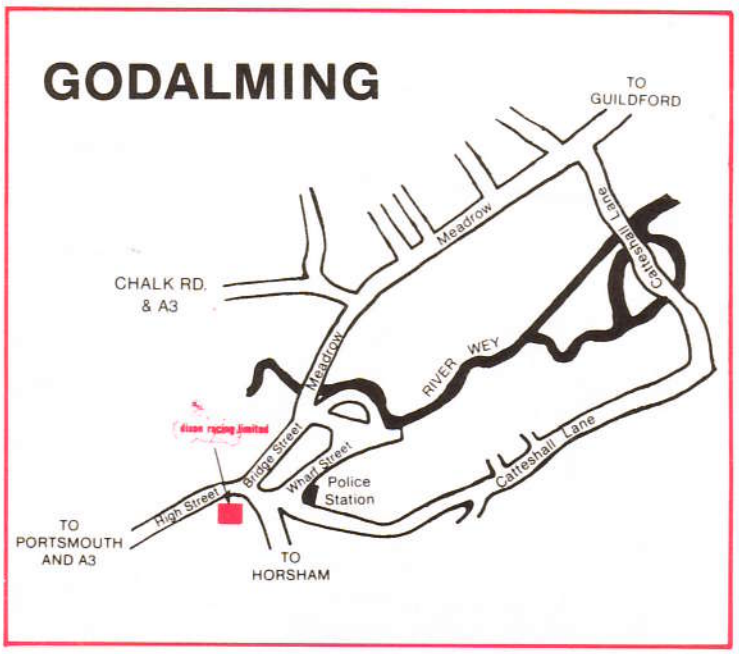
If the parts are temporarily out of stock, we will advise you of the expected delivery date. If that is not suitable for you, we will return your money.

WORKSHOP: whilst every effort will be made to accommodate urgent needs, all work must be booked in advance, either by telephone or in writing. And if you are booking in your bike, ensure precise details for work to be carried out are on the Job Card, which should then be authorised with your signature.

WHERE TO FIND US: Godalming is a delightful old Surrey town about 35 miles South-West of London. Look for Guildford, then down a bit! If approaching by road, we are the first shop in the High Street but as it is a corner, with double yellow lines (inevitably!) take the first left turn past the shop into Queen Street, and then first left again into the Queen Street car park. Leave your transport in the car park - our shop is only a few yards' walk down a passageway to the High Street.

If coming by train, Godalming station is on the main Waterloo-Portsmouth line; the station is at the opposite end of the High Street, about 10 minutes walk. Easy !





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