

Classic Japanese specialist John Wyatt (right) takes Mick Duckworth through four pot service

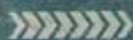


CLASSIC BIKE MASTERCLASS:

Jap multi service

With the right tools and a bit of knowledge servicing four-cylinder four-strokes isn't hard. John Wyatt passes on his tips from 20 years of multi-cylinder experience

**F350
Four**



When Honda first made road bikes with inline four engines in the late Sixties, there were fears that they were too complex for home mechanics to cope with. In reality, servicing is simple. But there are still tricks to learn from someone who works with them professionally.

John Wyatt's an expert on all Japanese bikes built between 1959 and 1980, but he's best known for his encyclopaedic knowledge of Hondas. He first owned a Honda four in 1975 and had a friend who attended the company's technical courses and passed on the literature to him. He founded Rising Sun Restorations 20 years ago, and is now based in an industrial unit on a former RAF bomber base in North Yorkshire. The well-equipped workshops deal with everything from concours restorations to engine building for Isle of Man races.

When we arrive, John has a customer's 1974 Honda CB350F standing on his main workbench. It's an American market model (the 1972-1974 32bhp CB350F was not listed by Honda UK); a well-preserved original bike.

"This is ideal for showing you the routine engine servicing jobs needed by any of the soho Honda fours of 1969-1980," says John.

"Servicing the CB750F, CB500F, CB550F and CB400 is virtually the same. Working on other early Japanese fours, like the Kawasaki Z1 and Z900 or the Suzuki GS750 and GS1000, is basically similar." By the end of the day we've had a CB750 on the bench too.

"These are easy bikes to work on, especially when compared with some modern Japanese fours," says John. "But you do need to work methodically and without rushing. I'd advise you to service these bikes at 3000-mile intervals, except for the oil and filter change, which I prefer to do every 1000 miles. The oil really takes a hit in these engines.

"The old Japanese fours are known for their reliability, but don't neglect routine servicing. Something may start as a £5 problem, but if ignored it can become a £500 problem.

"The main things to check regularly break down into four jobs. Valve clearances need to be correct for full performance and to prevent fuel wastage and overheated exhaust valves. Ignition timing needs to be spot-on for sweet running. Correct cam chain tension is needed to eliminate rattles and prevent heavy wear. Keeping the throttle slides in all four carburettors in unison is important for a smooth ride and steady idling.

"Keeping an eye on these will ensure that your engine is performing as well as it should. I know owners who are amazed at how much better their machines are when set up by the book. Obviously, it is worth doing all these checks on a bike you have just bought.

"The valve clearances should be checked with the engine cold, but the other jobs are done with a warm engine."

WHAT YOU NEED



John Wyatt's Davida vacuum gauges for synchronising carburettors; his factory Honda dwell meter for ignition points setting; and a carb adjusting tool set with spanner and long screwdriver

John Wyatt's tools for the job

To carry out routine servicing you won't need the vast array of tools that John has at his disposal, but you will need to own or borrow vacuum gauges, dwell meter, strobe gun and general hand tools.

John uses a set of Davida vacuum gauges (pictured), which are designed for motorcycle engines and have damped needles to prevent them fluctuating wildly. A set of four (John has a set of six to work on CBXs) costs about £80 with rigid adaptor tube for connecting to the take-off points. The gauges are calibrated in both inches of mercury (in Hg) and metric 'bars'. When using them the main objective is to get similar readings on all four cylinders.

Other types include the less costly Morgan Carb tune, which has four sliding rods rather than round gauges.

In order to adjust the carbs you can use a Honda special tool: carburettor synchronisation wrench part number 07908 4600200, at £24.31. This comprises a hollow tube to hold the locknut and long

screwdriver which slides into the tube to carry out adjustment. But John says: "It'll cost you an arm and a leg and it's rubbish. Just buy a carburettor adjusting tool for a tenner from M&P or any decent bike shop."

Timing lights vary from basic £20 strobe guns to sophisticated multi-function types in the £200 bracket. Look for a simple one with a really bright xenon bulb so that you won't need to work in near-darkness in order to see the the engine timing marks when 'frozen' by the flash of the strobe gun.

The more upmarket strobe lights incorporate a dwell meter, which is the most accurate way to set your points gaps. Some general-purpose multi testers costing around £25 have a dwell meter function. John's combination timing light and dwell meter (pictured) is a period professional tool made for Honda dealers.

When buying tools (see feature on sockets on page 72) it pays to invest in high quality. It is also important that the Phillips cross-head screwdrivers you use are a perfect fit.

Now that we are surrounded by elaborate, high-tech motorcycle and car engines, early Japanese fours don't look complicated any more

Ten minutes or about five-miles should be enough to get up to the necessary temperature. People who have a problem finding time to work on bikes can do the valve clearances one weekend and the other work the next.

"Getting all four carbs in balance is the thing that seems to scare people, but if you buy or borrow a set of vacuum gauges and you do the job without rushing it's straightforward. If an engine will idle nicely, that suggests that all the carburettors are already in synch, or not far off. And when you make adjustments, do them in really small increments.

This step-by-step guide is specific to single overhead camshaft Hondas, but the principles are the same for other early Japanese fours. >>

AVOIDING DISASTER



F-mark is for strobe check firing at idle

Timing and timing marks

If you turn the crankshaft with a spanner and look through the upper aperture in the main points backplate, you'll see two groups of markings on the rotor. The group labelled 1.4 is for cylinders one and four, while the 2.3 markings apply to cylinders two and three. When the line next to the T mark matches up with a groove you can see on a static plate, the relevant cylinders are at top dead centre.

Just along from the T, you will see another line with the letter F. This aligns with the static index line when the engine's firing correctly at idle (1000-1200rpm). At full advance rpm (2500rpm on a 750/Four) the timing light strobe should flash on the full advance marks - the two index marks close together on the rotor.



Top quality Snap-on strobe gun

Checking ignition timing with a strobe

Connect up the timing light. Leads usually go to battery and pick-up lead to the HT lead for the cylinder being checked.

Run the engine at a steady idle. Point the strobe gun at the F-mark to check that it aligns with fixed index mark.

What about advance? At the full advance rpm stated in manual point the strobe gun at the twin timing marks to check they align.

JOB 1: VALVE CLEARANCES



1 Remove all eight tappet access covers on the cambox, making sure that all their sealing rings are present and in good condition.



2 Remove the points cover on the right-hand side of the crankcase by undoing the two Phillips screws.



5 Use a feeler gauge to check rocker-to-valve clearances on the valves marked. The feeler should be just free enough to slide.



6 Slacken the locknut with a spanner. Turn the adjuster so the gauge will just slide, then tighten the locknut.

JOB 2: CAM CHAIN



1 The adjuster unit is on the cylinder block, between the centre cylinders. Usually at the rear, it faces the front on the Honda CB350/Four and CB400/Four.



2 Set the chain at its slackest. On Honda sohc fours, this is when an ignition advancer peg is visible in the points backplate aperture.



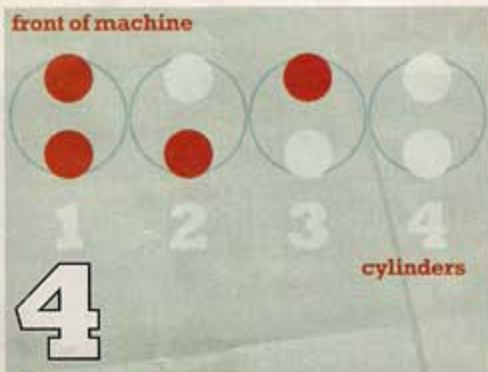
3 Hold the adjuster hexagon with an open end spanner and turn the locking nut anti-clockwise to loosen it.



4 Turn the adjuster one half-turn anti-clockwise, then turn it clockwise until it is felt to be just nipping up. Tighten the locking nut.



3 Rotate the crankshaft so the T is aligned with the mark; check both tappets on cylinder one for play. If there's none rotate through 360°.



4 Cylinder one is now on its compression stroke and you can proceed to check the valves that correspond with the red circles in the diagram.



7 Rotate crankshaft 360° to bring the T1-4 mark into the window with No4 cylinder at tdc on compression. Adjust 'white' valves (step 4).



8 Check the inspection cap threads are clean and carefully replace them with their seals. Replace the points cover.

EXPERT TIPS



John Wyatt

Rising Sun Restorations
01423 358004

- Put a small blob of grease on the end of the screwdriver when you're removing the vacuum take-off screws for the inner carbs; otherwise they can easily fall into an inaccessible place.

- The engine should not be too hot when you balance the carburettors. If it is, the gauges may go berserk. If one carb is well out, you can stop the engine, tweak the adjuster, and try again.

- Don't worry if all four vacuum gauges are not dead-on. We all like to get things perfect, but a small variation – up to half an inch of mercury – is not a problem.

- Before balancing the carbs, be sure that they are clean inside, free of dirt and crud from inside the tank.

- Because the cam chain tensioner is on the front of the CB350/CB400 cylinder block, it is exposed to muck and water. Always coat it in grease for protection.

- In my opinion a genuine Honda manual is the best.

- Dispose of used oil responsibly at a household waste site or a garage that takes it.

- Plan ahead. Remember to get a new oil filter before doing the oil change and, for example, order new tyres before the old ones become illegal.

- I use a 10w40 multigrade oil blend which incorporates all the transmission additives, the engine and transmission sharing a common oil supply. But any modern 10w40 oil is fine because it is designed to cope with transmission. The important point is to change the oil regularly because it has a hard life coping with plain bearing lubrication as well as transmission. I recommend every 1000 miles.

- If after adjusting the camchain (Job 2) the chain still rattles, let the engine idle and undo the tensioner locknut and bolt and keep 'nipping' it until it finds the stretched area of the chain.

JOB 3: DWELL/POINT GAP



1 Connect the dwell meter across the points for cylinders one and four, having removed the cover on the left side of the crankcase.



2 Run the engine at idle speed and check for a dwell angle of 49 degrees (plus or minus two degrees) using a dwell meter.



3 To adjust, slacken the two screws holding the main points backplate and carefully rotate it a little at a time to obtain the correct reading.



4 Check the dwell angle on the points for cylinders 3 and 4. To adjust, ease the screws on the secondary backplate and follow step 3.

JOB 4: CARB BALANCE



1 Remove the fuel tank for access to all four carburettors. Petrol left in the carbs will run the engine. Or feed an extension to the fuel pipe.



2 Remove all four vacuum take-off screws from the inlet manifolds. Make sure their sealing washers are present and in good order.



3 Thread in the four extender tubes from the gauge kit. The longer pair are for the two inner cylinders.



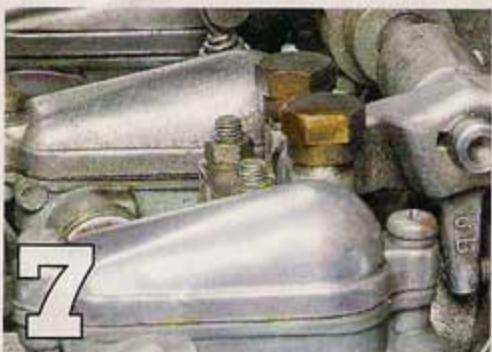
4 Connect the flexible tubes from the gauges to the adaptors, keeping them in the right order.



5 Start the engine and turn the main idler screw to set tickover at a steady 1000rpm. At these revs you have full oil pressure. At 900rpm you do not.



6 With the engine idling steadily, check if all four gauge needles give the same reading, which should be at or near six inches of mercury (6in Hg).



7 If one or more needles are obviously out of synch, you will need to adjust the vertical screw for the relevant carburettor.



8 Place the carb adjusting tool's tube spanner over the locking nut. Try very gently tightening it. This may move the needle in the right direction.



9 If adjustment is still needed, loosen the locknut using a tube spanner and insert the long screwdriver inside the spanner. Move the adjuster screw until the needle is in synch.



10 A useful check is to remove the carb tops to make sure the hexagons securing the slides to the lever arms are secure.

NOT GOT A HONDA?

Other makes

Twin cam engines involve shims for valve adjustment

Japanese four-stroke fours are basically the same except that Kawasaki, Yamaha and Suzuki use twin cams with bucket and shim valve adjustment. It's worth checking yourself, but unless you have the right tools and a selection of shims it's probably best to leave the adjustment to a specialist.

HOW MUCH?

For Rising Sun Restorations to do a 6000 mile service inc materials... **£200**
To balance the carburettors... **£40-£120**
To set valve clearances... **£50**
To set ignition timing... **£20**

Prices plus VAT

John Wyatt of Rising Sun Restorations is at Unit 10C Marston Business Park, Tockwith, Wetherby, North Yorkshire YO26 7QF. Tel: 01423 358004. Fax 359660. Mob 07889 886413.