

# BIG BREATHS FOR LC

... or how to make your RD250LC into a 350 convert

One question which Mechanics is being asked with increasing frequency by readers just lately is: "Can I convert my RD250LC to 350 spec?"

The simple answer is yes.

But the job may not be as straightforward as that simple answer implies. Many small modifications (Yamaha prefer to say "improvements") have been made to the LCs since the 250 was introduced in 1980 and it's important not to mix up certain parts of differing vintages.

Of course, the easiest and most reliable course to take would be to trot along to your local friendly Yamaha dealer and order all of the bits mentioned in the table (see right). The parts numbers given are for the 1981/82 spec' 350LC and as far as we are aware, they are the latest which are available.

Parts numbers for the 1980 bike are different from the 81/82 in the case of the barrels, pistons, rings, carburettors and exhausts. The last two digits in each case should read 00 instead of what is stated in the table, all except for the exhausts which are 08. The part number for the exhausts has caused some confusion among dealers because spares for the most recent model normally carry, numerically, the highest last two digits. But for some reason, Yamaha have reverted back to 01 for the latest pipes, and not 09, as you might expect.

Not everyone can afford to go out and buy all the new parts needed to convert a 250LC

to 350 spec', however, and it's most likely that the majority of people wanting to do the conversion will obtain their parts elsewhere, probably secondhand and probably from a reputable breaker.

This is where you've got to take care to buy the correct bits.

Take the exhausts, for instance. While the 250 and 350 exhausts carry different parts numbers in the Yamaha spares listings, the pipes themselves actually carry the same number — that of the 350 pipes. This is because both sets of pipes use the 350 rear cone, which is where the number is stamped. The only way you can tell the difference is to look at the exhaust mounting bracket and see if you can spot either a blob of paint or a stamped mark.

A green paint blob indicates 250 pipes, a pink blob 350 pipes. If the bracket is marked with a small 0, that also means 350 pipes and

if there's no mark at all, that probably means 250 pipes. The paint blob is the surest way of checking but it does wear off in time.

Fitting 250 pipes to a 350 engine will stifle it slightly whereas fitting 350 pipes to a 250 will make it breathe better and will marginally improve performance. That's why you rarely see a 250LC proddie racer with the paint blob still on the exhaust bracket! Incidentally, the individual 350 pipes are some £7 cheaper to buy new than the 250 pipes — a point to bear in mind during any "parts-swap" transactions.

If you've bought your pipes first, you then want to make sure that you buy a matching set of barrels or vice versa. Early-type barrels have a different exhaust flange fitting — the recess in the barrel for the gasket and the exhaust pipe collar has a smaller outside diameter on the early barrels. The early type exhausts could be made to fit the later type barrels but you will have to use the larger gasket and make sure that the exhaust collar is centrally positioned in the larger recess before tightening the two nuts.

It's doubtful that you would be able to make the later type exhaust fit the earlier barrels unless you weld some new collars onto the pipes.

The late-type barrels also have slightly lower intake and exhaust ports which is one reason why the earlier machines were a bit quicker. The distance between the top of the barrel and the top of the exhaust port on the



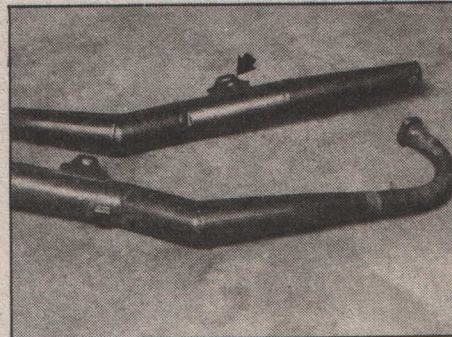
## Parts required for converting 250 to 350LC

Part	Part number	
Cylinder head.....	4LO-11111-00	(£70.19)
Head gasket.....	4LO-11181-00	(£8.60)
Cylinder.....	4LO-11311-10	(£136)
Cylinder.....	4LO-11321-10	(£142.97)
Piston (std) — 2.....	4LO-11631-01	(£21.25)
Piston ring set — 2.....	4LO-11610-01	(£12.33)
Gudgeon pin — 2.....	4LO-11633-00	(£3.26)
Small end — 2.....	93310-316H6	(£3.91)
Oil pump.....	4LO-13101-01	(£35.92)
Shaft worm.....	4LO-13175-02	(£3.98)
Carburettor.....	4LO-14101-01	(£46.54)
Carburettor.....	4LO-14102-01	(£43.84)
Exhaust.....	4LO-14710-01	(£89.92)
Exhaust.....	4LO-14720-01	(£91.08)
Clutch basket.....	4LO-16150-02	(£53.29)
Rear wheel sprocket.....	4LO-25439-2133	(£20.15)

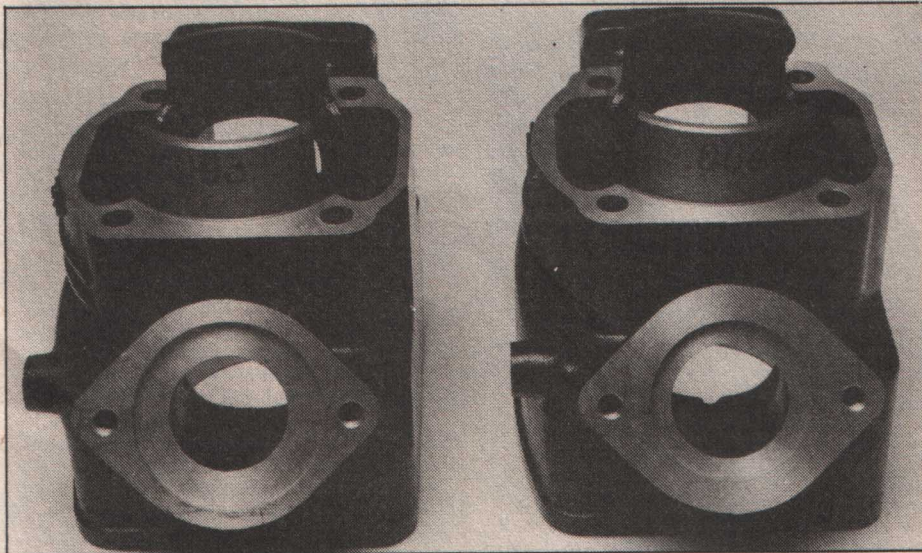
If you want to make your 250-to-350 conversion complete, you will need to fit in addition to the above, the 350 twin discs (£64.67 each) and brake master cylinder (£40.17), the 350 rear wheel (£159.02) which has a more comprehensive cush drive in it (£1.91 x 4), twin horns (!) and maybe new reed valve petals — see text. Prices include VAT.

later barrels is 30mm, while on the earlier 1980 barrels it is 29mm. The early barrels also carry a small notch in the top of the exhaust port just by the entry to the bore.

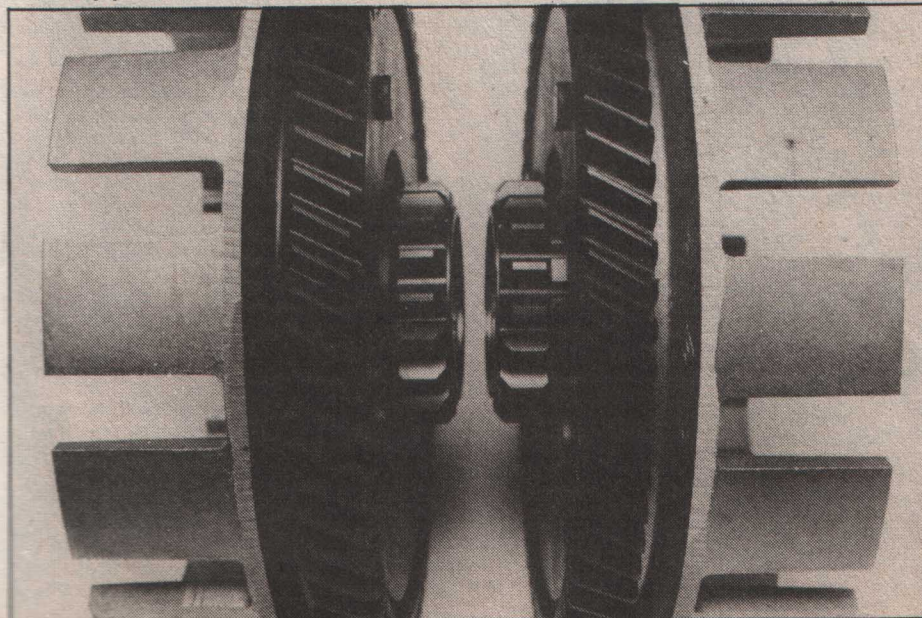
The 350's piston rings, gudgeon pins, head gasket, cylinder head and small ends have been improved over the years, even though some are just a change in material spec'. However, as far as we are aware, all these parts are interchangeable between early and



Spot the difference — literally! The blob of paint (arrowed) indicates 250 or 350 pipes.



Early type 350 barrels shown on the right have a smaller recess for the gasket and the exhaust pipe collar. There is also a small notch in the top of the exhaust port.



Another case of find the differences. The 350 primary drive/clutch basket is on the left. It has a large anti-chatter 'O' ring behind the teeth and a different internal cush drive.

late models. The later type pistons have a small groove where the circlip fits, so it's important to make sure you have the right circlips for the right pistons. The earlier pistons have no grooves but the circlip has a small kink in it.

You can convert the 250 carburettors to 350 spec by altering the pilot, needle and main jets but this does not produce the best results as the air jet is different between the two models.

Just like there are differences in the early and late barrels and exhausts, there are also differences between the early and late carbs for the 350. The early carburettors breathed through an air corrector orifice at the back of the carb but this caused a flat spot at about 4,500rpm as the motor picked up an air-gas swirl which made it run rich.

The early type carbs (numbers 4LO-14101/2-00) ran with a 160 main jet with a 140 as optional. The later type carb (4LO-14101/2-01) which has a ball bearing in the rear air breather to blank it off, has a 220 main jet. If you have no option but to trade-in your 250 carbs for a set of early type 350 carbs which have not been modified, you can take the carbs along to your nearest Yamaha dealer and get him to modify them for you for about £10.

Yamaha recommend that the early type carburettors should only be fitted with the early 350 type barrels. Put simply, the carbs marked with a 4LO-00 number match the barrel with a pip in the exhaust port, and the 4LO-01 carbs match the barrel without the pip.

You can use your 250 reed valve petals (type 4LO) with the early 350 barrels but you should use the square type (345) reeds in the late type barrels. If you do use your 250 reeds and find that even with the carb' throttle valve slackened right off, the motor won't tickover, that's a sure sign that the reed petal is worn and is not sealing properly.

You may not have been aware of this problem on your 250, because at bottom-dead-centre the inlet port is completely closed by the piston, but on the 350 at BDC, the inlet port window is still slightly open, allowing a back passage of gas into the other carburettor. To check for this problem, disconnect the balance pipe between the two carburettors and block it off. If this cures the tickover problem, it is the reed petal that is at fault. If the right-hand carburettor does not tickover properly, it is the left-hand reed which is faulty and vice versa.

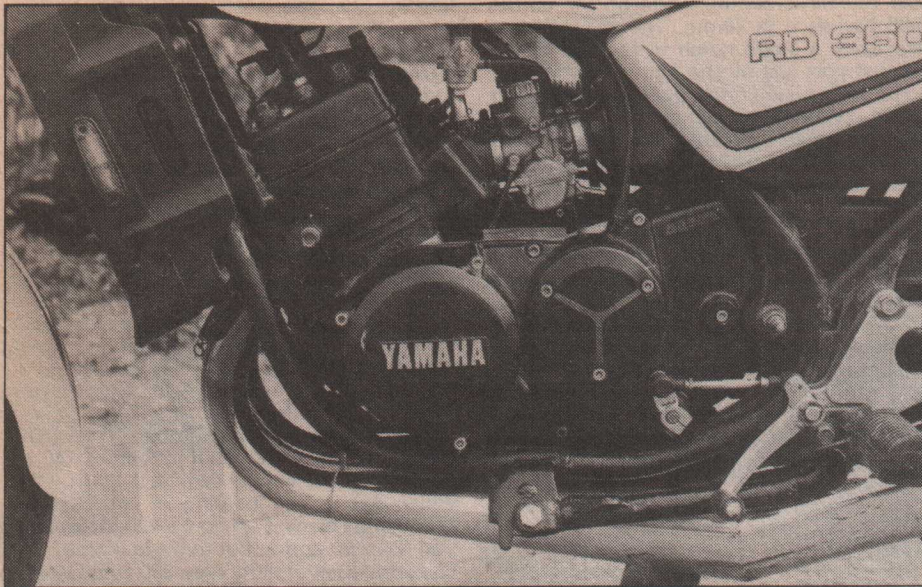
Ignition timing should not need altering when converting from 250 to 350 but it would be worth checking, and this requires the use of both a dial gauge and a good timing light. You cannot set the ignition timing with just the timing light alone; you can only use a strobe to check that the timing marks are in correct alignment when the motor is running at 2,000rpm after the engine has been timed at 2mm before-top-dead-centre with the dial gauge. If you suspect that a new pick-up coil or rotor has been fitted you may have to scribe a new line, before retiming your engine with the dial gauge.

Both motors run on standard B-8ES spark plugs.

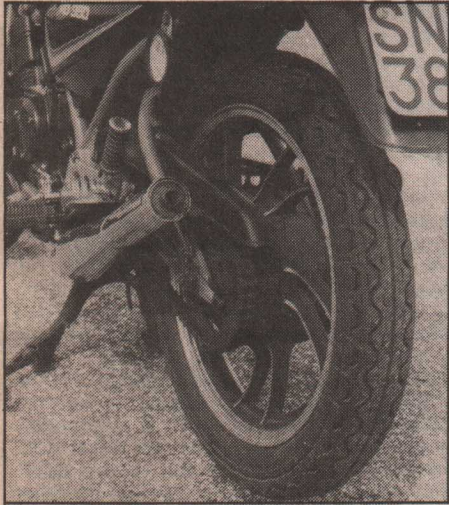
The two-stroke oil pump has a different flow ratio on the 350LC so you'll have to change the pump and the shaft worm that drives it. The water pump is the same on both bikes as is the rest of the cooling system, including the radiator.

The only other variance in the engine is to the primary drive gear-cum-clutch basket. The only visible difference is that the 350 clutch body has an anti-vibration 'O' ring ▶





Here is a 250-350 conversion completed. The bike's owner, Adam Burbage, swapped his 250 bits plus £100 for the 350 parts he needed. The pipes are Allspeed.



Twin discs are a must if you want to make your 350 conversion safe and complete.



The 350LC has two teeth less on the rear sprocket. The rear wheel is also different.

fitted behind the primary gear to prevent too much "chatter" at low engine speeds. The cush drive within the clutch basket is almost certainly different too. If you have a suspect clutch on your 250, you'll soon notice it when you've done the 350 conversion. You may have to renew the clutch springs to stop it slipping. The primary drive gear ratio is the same on both bikes.

Both LCs have a 16-tooth gearbox sprocket, but the 250 has a 41-tooth rear wheel sprocket compared with a 39-tooth rear sprocket for the 350. If you don't change the gearing, peak power will not occur at peak revs and your newly-converted 350 just won't be as fast as it should be.

The rear wheel on the 350 is also designed to accommodate a more sophisticated cush drive arrangement. You can retain the 250 rear wheel but you ought to keep a check on the state of the sprocket bolts.

Having completed the engine mods, you ought then to seriously consider fitting the 350's front twin disc set-up; you'll certainly need the extra stopping power.

If you do fit the twin discs, and we strongly recommend you to do so, you will also have to swap the master cylinder at the handlebars because it has a different size piston in it. If you don't change the master cylinder, the lever action will be very spongy and will pull back to the handlebars.

The 250 and 350 share the same bottom end in the engine including the conrods, the same air box, brake shoes, type and size of rear drive chain and the same size tyres. The 350 has twin horns!

Finally, don't forget to notify your insurance company and the DVLC at Swansea of the changes you have made, and you'll need to have the bike taxed because a machine over 249cc falls into the next higher tax bracket.

Remember, if you cannot afford to buy all of your 350 bits new — and let's face it, who's going to shell out over £1,100 for the full conversion? — the next best thing would be to buy, say, a complete engine, etc., from a reputable breaker. If you do have to resort to buying the bits piecemeal, try and make sure that you match up whatever you do buy using parts from early or late models.

Malcolm Gough

For people interested in racing their RD250 or 350LCs, Yamaha Motor in Amsterdam, Holland, have issued a technical service bulletin outlining some simple but effective tune-up modifications.

The mods should, say Yamaha, increase the power output of each bike by about 3hp.

They involve enlarging the exhaust ports, skimming the head and altering the internals of the exhaust pipes.

As the drawings show, the amount of metal you remove from the top of the ex-

haust port varies depending on whether it is a 250 or a 350 and whether it's an early or late 350. The important thing to remember is that in each case, the distance between the top of the exhaust port and the top surface of the barrel should be reduced to 28mm.

You can remove the metal with a grinder or a file; just make sure the top two corners are smooth and continuous.

The surface of the cylinder head should be skimmed 0.4-0.5mm for the RD250LC and 0.5-0.6mm for the 350LC. Yamaha suggest that you sandpaper the head face on a surface plate, starting with a 100 grade and finishing with a 400 grade as the target

thickness is approached. It may be easier for some readers, however, to have the head skimmed on a milling machine by an engineering shop.

The drawings show you how to modify the exhaust pipes. You will need to cut open the muffler at an appropriate place to enable you to remove the wire net from towards the front of the pipe. The glass wool is simply removed from the rearmost section.

Yamaha also mention that an RD350LC muffler will do a good job on the RD250LC, but not the other way round.

The oil pump gear can also be removed and the engine run on a 30:1 petrol-oil mix using Castrol A545 or 747. The spark plug should be changed from the standard B-8ES to a B-9ES or a B-9EV.

The carburettor main jet will also have to be changed. Start with a 180 or 190 main jet in the 250LC and a 170 main jet in the early (1980) 350LC and a 220 main jet in the late (1981-82) 350LC. Increase the number if lean and decrease the number if rich.

As a final note, Yamaha say that no factory tests have been conducted to check on the effects of such spec' changes on engine life.

Of course, if you do make the changes, don't expect to recover any broken parts under warranty!

