CX500 / GL500 / CX650 / GL650

Web Resource

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Rob Davis, Telford, Shropshire UK

Servicing and help pages, by topic

The CDI-ignition CX400 / GL400 is serviced as per the CX500 Z, A, B, C or GL500. Versions with transistorised ignition are serviced as per the Eurosport CX500EC.

FAQ / Frequently Asked Questions

OWERS and USERS | ENGINE, CLUTCH, GEARBOX | FUEL & LUBRICATION

COOLING SYSTEM | ELECTRICAL | FRAME & FORKS

WHEELS BRAKES & TYRES

Links to other recommended Honda CX500 / GL500 / CX650 / GL650 sites	
Chopper Charles' **International CX / GL Technical Forum**	**CX Forum**
EBAY UK, US, Germany	
Paste ***(cx500, cx 500, gl500, gl 500, cx650, cx 650, gl650, gl 650, cx400, cx 400, gl400, gl 400, gl700, gl 700) -hitachi -epson -fishing -cruciform -casio -decker*** ino the Ebay search box and then add the resultant page to your *Favourites* or *Bookmarks*	
CX500, GL500, CX650, GL650, CX400, GL400, GL700 items on **UK Ebay**.	**Ebay**
CX500, GL500, CX650, GL650, CX400, GL400, GL700 items on **USA Ebay** Motors *(beware shipping costs, and you may have import duties as well. Have the sender describe the goods as 'scrap parts of no commercial value').*	**Ebay Motors USA**
CX500, GL500, CX650, GL650, CX400, GL400, GL700 items on **Ebay Germany** *(translate carefully, and make sure the seller will ship to the UK)* ***Some useful words*** : *Bremsbeläge* = brake shoes / *hinten* = rear / *Drehzahlmesserwelle* = speedo cable / *gut* = good / *sehr* = very / *Regler* = regulator-rectifier / *rot* = red / *Lichtmaschine* = stator / *Anlasserrelais* = starter solenoid / *Nockenwelle* = camshaft / *Kupplung* = clutch / *deckel* = cover / *Sicherrungskasten* = fusebox / *Krümmerhalterungen* = exhaust flanges / *Heckfender* = rear mudguard / *Rück* = rear / *licht* = light / *neu* = new / *Seitendeckel* = side panel / *vergaser* = carburettors / *sitzbankbugel* = grab rail / *kühler* = radiator / *(hinter) rad* = (rear) wheel / *rahmen* = frame / *hauptständer* = main (centre) stand / *Lenker* = handlebars / *Fussbremshebel* = footbrake pedal **Will you post this to England and how much will this cost?** *Könnten Sie die Teile nach England verschicken und wieviel würde das kosten ?* **Would you please contact me if the article does not sell?** Könnten Sie mich bitten kontaktieren, wenn das Teil nicht verkauft wurde. Danke **I have received the article safely, many thanks**. *Ich habe den Artikel erhalten. Vielen Dank.* **I have not received the article, please tell me when it was sent**. *Ich habe den Artikel nicht erhalten. Wann haben Sie die Sendung verschickt.* **Item as described, no problems, would buy again**. *Ware wie beschrieben, schnell und gut, gerne wieder*.	**German Ebay** *It's been my experience that German sellers are reluctant to take PayPal. As a bank draft or electronic transfer will probably cost more than the item, I've had no choice but to send cash in Euros for my purchases.* *This has been a gamble but has worked fine on all occasions.*
Very good site on technical detail, with a good picture gallery.	**CX Site**
Wemoto in Hove, Sussex, sell may useful CX and GL parts including indicators for ZABs which are almost indistinguishable from OEM.	**Wemoto**

For Stainless Steel capscrews, nuts, bolts, clips, fasteners and washers etc, try ***Pratt Lay Ltd*** ("Stagonset") in Sutton Coldfield	**Pratt Lay**
John Oldfield spares - I've had good service from them	**John Oldfield**
L.M. Spares (The Bike Shed) of Longworth Lane, Bartestree, Hereford, HR1 4DF supplied me with a good condition low mileage CX500 oil pump, complete with strainer etc. Efficient service at a good price; ***recommended***..	**L M Spares**
Carole Nash Motor Cycle Insurance (UK only). Expensive, includes UK / European breakdown cover. No NCD on Classic insurance, and tends to go up steadily every year.	**Carole Nash**
Footman James Motor Cycle Insurance (UK only). Also covers you for UK / European riding and breakdown. ***HIGHLY RECOMMENDED***! They also did me several excellent travel-insurances on various foreign trips and more than halved my car and household premiums.	**Footman James**
David Silver spares and replacements. Most efficient service, a trifle pricy, but ***recommended.***	**David Silver**
The **Australian** CX500 / GL500 / CX650 / GL650 Register and Bulletin Board	**Down Under**
Dutch CX Club.	**Dutch CX Club**
US Suppliers of parts, with useful cross reference system	**US Parts and here**

My Motorcycle History

Yours truly (*left*) with LUD297W after its rebuild, April 2006. In this photo the tank decals have yet to be added. The conservatory (= *winter bike rebuild area*) has just been returned to normal use!

First Tour - May 1973

I came into motorcycling by mistake, because when I started a new job in May 1973, suddenly I needed transport. As I hadn't passed my car driving test, and couldn't afford a car anyway, the only alternative was a motorcycle. I didn't know anything about them - they were just the only alternative.

My nearest dealer in Leicester (UK) was Newton's, a small cycle / commuter bike shop on the Uppingham Road not far from where Haramead Business Park is now. I explained my requirement and was sold a blue Honda CB125s (KAY216L), which, with soft panniers, cost me £214. I knew that I wanted one of the then "newfangled" full face helmets, and was sold one as well.

Newtons did not sell boots or gauntlets, and directed me to Motor Cycle Accessories, in Belgrave Gate, Leicester. The bloke there realised immediately that I was a newbie, and advised me to change the helmet, as the one I had been sold was really an open face helmet with a chin guard riveted on. This good advice did not go down well with the original dealer, but I ended up with an Owens helmet and traditional style high calf boots and gloves.

I began motorcycling a few months before helmets were made compulsory in August 1973. But there was no compulsory training in those days. I had the controls explained to me, and I was off. I crashed it about a week later, going too fast into a bend up near Houghton-on-the-Hill, and luckily did no damage to myself and only bent an indicator and very slightly twisted the forks on the bike. Lucky me.

I don't have any pictures of my own bike; the one opposite was from an Ebay sale, but looking at it brings back many memories. This was my "first tour of duty" on a motorcycle and I quickly found that I loved every minute of it.

Even today I can look at people with obviously new bikes who are just starting out, and from the grin on their faces, I know exactly how they feel. I soon added a rack, top box, front crash bars and a pillion backrest, and removed the awful canvas panniers which came with the bike from new.

How I passed my driving "L" Test I don't know, but I went all over the country on the CB125s, including a 400 mile, two-up trip from Leicester to Bognor Regis in August 1973, with camping gear. Needless to say, this trip took a long time and wasn't very comfortable, especially for Steve Thorne, the passenger. The bike clocked up 15,000 miles before the piston seized and I part-exchanged it for a CD175, RJF944M; I just missed the last CB175. I bought it from Derek Hulbert's, a motorcycle dealer on Green Lane Road, Evington, Leicester.

This ugly duckling of a bike served me rather well. I clocked up 24,000 miles on it between early 1974 and mid 1976, including a trip to Paris. It rumbled along at 60 mph, drank petrol at about 70 mpg and I learned all about engines by working on it, first simple stuff like tappets and cam chain adjustment, then complete engine work. It always went back together and it ran without complaint even after my early inexpert spannering.

It had only four gears and no electric start, the 6 volt lights were atrocious, and it vibrated. However, the enclosed chain was a godsend in disguise as I only had to change it once it in all the miles it did. Notice the front number plate - this was a legal requirement in those days. I removed it when front number plates for motorcycles were abolished.

The bike eventually acquired the name "Lord of the Dance" I think just because I liked the tune. I forget how many times I crashed it, must have been at least half a dozen times, again without any major injury or damage. At this time I was doing a lot of ice skating and seemed to be burbling happily up the Six Hills Road between Leicester and Nottingham Ice Stadium at least twice a week.

I sold the CD175 in summer 1976 because I left home and couldn't afford to keep it on. There was then a painful no-bike period until summer 1979. Anyone who's experienced the dreadful craving to get back on a motorcycle will know exactly how I felt, and how pleased I was to be able to afford another one again. I still had all my riding kit, fortunately.

Second Tour - Summer 1979

This picture dates from summer 1980 and shows my third bike, the Honda CB400T "Dream" TRY407S that I bought from Ken Ives Honda on Loughborough Road, Leicester. I paid £750 for it, and it represents (along with a second 400T) my "second tour of duty". Here it has the extras I added; rack, top box, nose fairing.

The 400T acquired the name "Creaking Door" and it was an easy bike to ride - electric start, decent lights, and I gradually added bits to it as you see in the photo. Performance was good for a 4 stroke 400 - it would cruise comfortably at 70 and returned 50-55 mpg. Handling was a little adventurous but improved markedly once I'd added harder rear shocks.

In those days, the original Japanese Bridgestone tyres were notoriously slippery in the rain, and it was common on a new bike for the original tyres to be ridden nothing more than a few miles from the dealer to your house before being replaced by Avon Roadrunners or Dunlop TT100s.

I eventually changed the 16 tooth front sprocket to the 17 tooth one from a CB400/4 as this gave better economy and cruising, dropping the revs by about 1,000 at 70 mph, at the expense of acceleration. Eventually I owned two 400Ts. Having only a single front disc, it was noticeably underbraked, especially when carrying a passenger.

Servicing was a doddle, and this is the engine I came to know well, as I acquired a spare engine and gave demonstrations to friends on how to dismantle it, showing how easy it was to work on.

This is an engine closeup of the 2nd CB400T I owned, UUT235S, after I'd resprayed the side panels and tank. The 400 Dream / Superdream engine was a real good one. It was a 360 degree crank, saving on coil and ignition costs, but the motor had chain driven bobweights to rotate in the opposite direction, and the vibration was very low.

My first wife Fiona had a CB125s TWS555T when we first went out. Later she had a CB250N Superdream GJF939V and after passing her test, a CB400NA Superdream ONR394W which was a much better bike all round. After that she had a VT500 A858FFP and she still had that when we separated in September 1986. Her second husband, Paul, also had several bikes, a CB400N, a CB650, and later an XJ650. I hope they're both still into bikes, and enjoying their motorcycling in Market Harborough.

The 400T was a pleasant if unexciting bike and I wanted something more powerful and requiring less maintenance. This meant a watercooled shaft drive bike and the only feasible and affordable option was Honda's CX500. During a visit to what was then my local dealer (D C Cook Motorcycles on Belgrave Road, Leicester) in April 1981, a chap rode up on an immaculate red CX500 and said to Martin the salesman that although he had bought it from them only 10 months ago, he didn't like it and wanted to change. "Don't go away," I said instantly, "I'll buy it." It cost me £1,050.

Here it is parked in the garage area at the rear of the house at Broughton Astley, Leicestershire, and pretty much as I used it throughout its time with me. Later I changed the top box and the extension to the windscreen Its official name was "Desdichado", but was usually known as "Henry".

This bike completely fitted me, not just physically, but sort of mentally as well, because it matched my riding style. I had fourteen years of pure motorcycling joy out of it, and developed a lifelong love affair with the CX500. FET800V and I went all over England, including Jersey, and I had not one iota of trouble with it in 34,000 miles. It had a very pleasing life, as it was only used in dry summer weather; I kept the 400T for instructing (I was a Star Rider Gold / Advanced instructor {AMI 2983}, later a Part One Test Examiner {AME2983}, for seven years) and it hibernated in the winter.

It started completely standard and I added various extras over the years I had it. This picture shows the crash bars, spotlights and handlebar fairing in a more close-up view.

I changed the cam chain and decoked it at about 30,000 miles but this was purely preventative maintenance and apart from regular oil and filter changes I never really lifted a spanner in anger in 14 years. The most serious problem I ever had with it was a blown main fuse - mind you this was on a dark moonless summer night, whizzing down some country roads near Hastings!

I once had to bale out at 70mph on the M1 due to a burst front tyre, but as luck would have it, I'd been shown how to do this only a day or so before, and was lucky enough to survive practically unscathed. The bike was laid down on its crash bars which were of course wrecked, and I lost a spotlight, a mirror and an indicator. I repaired the puncture and rode the bike home and simply replaced the crash bars and broken bits.

(In April 2006 I was given back the rear crash bars!)

The snap, taken in summer 1982, shows the Honda CBX550F1 which I bought from new. I don't quite know what made me buy it, as I found that I didn't like it at all. When we unexpectedly had the chance to buy our first car (a Ford Fiesta) a few months later, I was pleased to sell it. The bike's only saving grace was a terrifically punchy engine and equally astonishing brakes. But it just didn't fit my riding style, and I didn't miss it afterwards. YFP939Y or something like that, I don't exactly remember.

Here it is shown immediately after Roy Woods Motorcycles of Hinckley built it. Although I'd sold the 400 Dream by then, afterwards I kept the CX500 in storage at a friend's house throughout two house moves whilst I settled at Anstey in Leicestershire. Then it came home, but financial restraints kept it of the road, I just cranked up the engine from time to time.

I took a year out in 1994/5 to do a full time Master's Degree in IT and simply ran short of money in spring 1995. Selling the CX500 broke my heart. It went to a chap in Rugby. I owned it for exactly fourteen years. I think I sold it for about £500 and if I divided 14 years by the difference between what I paid for it plus the running costs, I can't think of anything that ever gave me more value for money in terms of pleasure and enjoyment.

Update on FET800V - August 2003

David Kerr, a forner CX owner from nearby Whitchurch, had seen a CX500 near Oswestry whilst looking for a project machine. After his visit, he found these web pages and recognised FET800V as the bike he had seen. On August 6th 2003, 8½ years after I sold it, I saw the bike again.

It was perfectly recognisable as mine. It still had the mirrors, rack, crash bars, front mudguard, handlebar grips I fitted to it in the 1980s, and there were even traces of the red engine paint! It didn't have the flyscreen - that has been fitted to both of the subsequent CXs I owned, and removed again when they had windscreens fitted!. But I still have the flyscreen.

Clearly it was well looked after whilst in other hands. We didn't start the engine, as there was no coolant in the radiator, but it looked almost exactly as it did when I sold it, apart from having another 30,000 miles on the clock and a few minor additional blemishes. I was really pleased to see it again and in such good health. It served me so well that I'd hate to think of it in bad hands. How curious that having sold it in Leicester, it turned up only 30 miles from where we now live in Telford.

FURTHER UPDATE April 2006

David unthinkingly sold this bike about 18 months ago to **Steven Bayes**, of my area of Telford and about ***1/4 of a mile from where I live***! Can you believe that kind of coincidence?

I tried to contact Steven, but he moved away "up north" in 2005. The bike is presently SORNed, but if Steven or a subsequent owner reads this, please get in touch. David did return the rear crash bars, which he hadn't passed on with the bike, so these have now gone full circle of ownership. Where are you now, **FET800V**?

Anyway ... back to the story ...

Then followed another "lean and hungry bike wilderness" and every year it was dreadful to watch the riders coming out in April & May to enjoy the summers on two wheels. Every year it was "this year I'm going to do it..." but that was a dream until 2002.

Third Tour - Easter 2002

Spring 2002 was the worst bike-fever time I ever had and I was absolutely determined to get back on a motorcycle again ... and if I could find another CX500, so much the better. I started looking and after one disappointment, found LUD297W in Bridgnorth, having moved house to Telford by this time. The owner, Dave Jenning, was selling several bikes and I bought it on the spot, simply because it was exactly what I wanted.

This bike came bare except for the engine bars. I've added the flyscreen from my first CX, (later swapped for a windscreen) plus a new rear carrier and top box. The bike was registered on January 1st 1981, which as at January 2009 makes it 28 years old.

Mileage at purchase 30th March 2002 was 37,500. I paid £550 for it. I call it "Valiant". Not knowing the service history and wanting to start with a clean slate, I took out the engine immediately, changing the cam chain and tensioning apparatus, oil and filters etc and fitting new Continental Tour tyres.

I found that the cam chain tensioner locking bolt had been overtightened at some stage, resulting in the thread being stripped inside the rear crankcase. I had this repaired professionally, and I've since learned to **do this job** myself.

LUD297W runs extremely well indeed, returns an average of 55 mpg and cruises effortlessly at whatever speed you like between 60 and 80 mph, the sturdy engine prepared to run up "combat power" of 100 mph if necessary. I tend to cruise at a steady 70 and overtake up to 90 and the engine feels just as reliable and unburstable as the first CX I had.

Distinctive front view shows the cylinder heads, exhaust downpipes and crash protectors. Spares and replacements come from **David Silver**. Tyres, consumables and riding kit from **Wylie & Holland Motor Cycles, Wellington, Shropshire 01952 248868**. Thanks to W&H for ever-friendly advice on equipment and to both suppliers for prompt service on delivery for ordered items.

In June 2006 I identified all the previous owners and wrote to four of them, but had no response. In case you don't know, you can send five pounds to the DVLA and they will send you copies of all the transfer documents relating to any vehicle you own.

Photo after fitting the Givi detachable top box. As the side stand was causing the bike to lean too far over, I removed it and had an extra 1" section welded in, between the spring lug and the footplate. This brings the bike to a safer, more vertical angle when I use the propstand. I have stuffed white towelling between the mudguard and the frame, to stop muck and dust getting in.

Although I used 'soft' throwover panniers for the 2007 'Adventure' bike holiday to the Czech Republic and Poland, and was happy with the way they worked, in early 2008 I changed the chrome rack for a combined rack and 'hard' side pannier set, ready for the 2008 'Adventure' to the Pyrenean mountains.

Rebuild - Spring 2006

Valiant was stripped and rebuilt in March 2006, with the frame and metals shot blasted and powder coated, tank and plastics resprayed, new rear light unit and steel braided brake pipes fitted. Thanks again to cheerful Cledwyn of MCRP (Midland Coating Removal Process) Unit 38, Hadley Park Industrial Estate, Hadley, Telford TF1 6PY (01952 240849) who did the shot blasting; Kyops

Manufacturing, Unit A8, Halesfield 9, Telford TF7 4QW. 01952 583988 who did the powder coating; also JB Autos of Ironbridge, who did the respraying.

A rebuild was the least I can do for a faithful, reliable friend who in September 2005 carried me faultlessly almost 900 miles in three days, on a trip between Telford and Salen, Ardnamurchan in the Scottish Highlands, resulting in a three month IT contract in Salen. I stayed at Glenborrodale Castle gatehouse for 3 weeks and the remaining 10 weeks in the Willow Lodge at Resipole Farm caravan site, both of which I recommend.

In May 2007 Valiant took me on a 2,500 mile 10 day tour from Telford to Prague (scene of the Heydrich assassination in June 1942), Zagan or Sagan in Poland (scene of the Great Escape at Stalag Luft III; Colditz Castle (the famous prisoner of war camp), the Eder Dam (second target of the Dam Busters raid) and finally Waterloo (where Napoleon met his defeat at the hands of Wellington and Blucher). The only technical failure was a broken throttle cable - this was a roadside fix, as I carried spares. Average fuel consumption was 52 mpg, fully loaded and with some 80-85 mph autobahn cruising.

Here we are at the exit to the tunnel 'Harry' through which 76 men escaped in March 1944.

In May 2008 the same bike took me down France, over the Millau Viaduct, into Spain and Andorra, over the Pyrenees and back up the Bay of Biscay on a 2,700 mile 8 day tour. Did a motorcycle heart ever beat more Valiantly?

There is some Youtube footage of me **negotiating the Pyrenean hairpin bends**.

WORK - *THIS* IS WHY YOU DO IT

For bike-to-bike communications we use Cobra MT525 personal mobile radio (PMR) handsets with the heavy duty "Professional" headsets and harness, these are available from Intaride and we have found them to be of excellent quality and very durable. Don't buy the cheaper Maplins headsets as these are not robust enough for bike use. The "gun button" type press-to-talk switch is better than the rubber handlebar-grip type.

I had to sell the 8'x6' wooden shed and erect a much larger 10'x9' metal shed to accommodate three CX500s. Be careful if you buy a CX of any sort. They grow on you. Turn your back and you suddenly find you have acquired another one. To illustrate the point, in 2004 I rebuilt from scratch, a CX500 imported from Germany as a basket case (it was originally owned by Norbert Erich Ahrend of Ronnenberg, near Hannover).

The "Hannover Express" (DUJ63T) was in almost showroom condition after its rebuild. Here we are in its maiden voyage.

This bike was sold in June 2008 to a fellow Owners' Club member.

In 2005 I bought a CX500 Turbo (B748MRK) but although this bike was a blast to ride, it was a nightmare to own. Spares are impossible, and after spending time and money rebuilding in in April 2008, it developed an untraceable and apparently uncurable engine fault. Totally fed up with it after so much work. money and effort to rebuild it and get it running properly - and as it was worth far more as spares than as a going bike - I dismantled it and sold it as spare parts, here is a list of what is still available.

Do I miss it? No. I bought a much better bike ... see next section.

Fourth Tour - 16th August 2008

Having sold the Hannover Express and a lot of the Turbo spares, I now own a lovely red **NT650 Deauville**, collected today from Brighton. I am the second owner and the bike is immaculate condtion, just 6,500 miles after 5 years in the hands of the original owner. Many thanks to Rick Thompson for selling what must have been a dear possession. I am already very impressed with it!

Here is ***"the Red Fox"*** my NT650 the day after I brought it home and spent two hours cleaning it, after a very wet ride back from Brighton.

CX500 / GL500 / CX650 / GL650

FREQUENTLY ASKED QUESTIONS (FAQ)

There is additional information on the **History** and **Buying Tips** pages.

Prime Question : How do I join the UK CX/GL Owners' Club? Click here for the club website and message board and then the "New Members Start Here" tab on the left of the main screen.

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1 What fuel should I use?

Honda engines since the early 1970s were designed to run on what used to be called 2 Star, and now work perfectly on unleaded petrol. It does no harm to infrequently use an additive such as Redex.

Fuel tap position : horizontal = off. Arm downwards = main tank. Arm upwards = reserve.

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2 Should I use oil additives?

No. The clutches are "wet" i.e. they operate under general lubrication splash from the engine, and an oil additive which is designed to make the engine oil more "slippery" may well cause the clutch to slip as well.

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3 How often should I change the oil and filter?

Every 3,000 miles. Always change both, and do not use pattern oil filters.

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4 What engine oil should I use?

Any good quality mineral oil in the 15w-40w range, unless you have a vastly hotter or colder climate than usual. For donkey's years I've used bog standard oil from my local supermarket, and after stripping the engine, found it completely clean inside.

Standard mineral oil is best in these engines. It's worth remembering that modern synthetic, part-synthetic or any oil with additives is likely to make the clutch slip. This is because the Honda clutches are designed to run 'wet', i.e. in general lubrication splash from the engine.

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5 What are the main weak spots of the CX/GL?

Given good maintenance and regular oil and filter changes, the engines will pretty much go round the clock (and in some cases, more). The primary cause of engine failure is not changing the **cam**

chain when it starts to slap about and the tensioner is at the end of its adjustment. This chews away aluminium from the engine casings and the shavings contaminate the oil supply, leading to premature big end failure. The **stators** tend to fail at about the 40,000 mile or 20 year old mark, as do the **mechanical seals**. These three jobs are usually done as one operation (the "triple bypass").

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6 What are the main settings, pressures etc?

Print out this **quick-reference** sheet.

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7 What fuel consumption can I expect?

Both the CX500s I have owned have averaged 54 mpg under all conditions. This is UK (Imperial) gallons at 8 pints per gallon. A, B, Z and EC models will easily cover 160 miles on a complete tankful and nursing the engine could probably squeeze 200 miles out of it. Custom variants have much smaller tanks and 110-130 miles seems to be their maximum. However when running onto reserve, all CXs give only the ghost of a warning, and you have to switch tanks particularly quickly. So it's worth practicing this.

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8 Are these bikes comfortable to ride?

Very. They have big fat saddles and especially, the pillion seat is extremely comfortable. A fairing or windscreen is advisable at high speeds.

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9 Are there any handling vices?

Only that if you get the bike airborne, it will roll sideways as the bike tries to rotate around the crankshaft. So don't go bridge jumping on a CX or GL. Apart from this, I've never found any handling vices. Don't listen to stories that shaft drive bikes are difficult to ride. Once you've had a no-maintenance shaft drive bike, you'll never want another oily, expensive and messily adjustable chain-and-sprocket bike.

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10 At what mileage do problems start to occur?

40,000 miles for **cam chain**, **mechanical seal** and **stator**. These are not difficult DiY fixes but all are engine-out jobs and usually done together, the famous CX "triple bypass" operation.

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11 I've heard about the infamous CX cam chain problems, how true are these stories?

The earliest batch of CX500Zs had a design deficiency which made the cam chain **tensioner blade** snap. This was fixed by Honda and **frame numbers** after 2034366 are fine. Earlier models had modifications fitted and unmodified engines are extremely unlikely to have survived this long.

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12 What performance can I expect?

The A, B, Z and EC 500s are quite happy to cruise at anything between 50 and 80 with a top on-the-flat speed of about 105 mph. The Custom variants, having smaller rear wheels, accelerate better from rest but are not so comfortable at speeds exceeding 70. The 650s will cruise at up to 90 with a top speed of about 115 mph. However, I don't advise running an elderly engine at more than 70% power for long periods.

The Turbos are massively more powerful. The 500 will pull 120 mph and the 650 will wind up to at least 140, with astonishing acceleration.

All the models will pull away from 30 mph in top gear and generally have huge amounts of low speed torque.

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13 What revs do these engines handle?

All the CX and GL range are designed as high-revving engines, usually redlined well after 9,500 rpm. It is perfectly normal to cruise them at between 6,000 and 7,000 rpm for long periods.

The ZAB and EC 500s do 6,000 rpm at 70 mph but the 500 Customs and GL500s rev higher - about 6,250 - due the small 16" rear wheel. The ZAB 18" rear wheel drops straight in, if you want to reduce the revs at motorway speeds.

The Eurosport 650s and 500 Turbo do a shade under 5,000 rpm at an indicated 70 mph. If anyone has figures for the GL650 and 650 Turbo, please tell me. Note that the 650 engines are nothing like as smooth-running as the 500s, and vibrate considerably more. It's a joy to trundle a fully warmed-up 500 along at 30 mph in top gear and listen to the deep purr of the engine.

A rider brought up on slow-reviing engines will often think that the CX/GL motor is revving its guts out. Don't worry, it isn't.

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14 Are spares a problem on these 20+ year old bikes?

Whilst tyres, disc brake pads and rear brake shoes, plus filters and consumables, are readily available, some of the items which are particular to these models have been discontinued by Honda. However, they are all easily obtained from motorcycle breakers or within an owners' club, as between-member swaps. Ebay is another fertile source of both complete bikes and spares.

The only spare which is unobtainable is the front mudguard but the pattern one most of us use is a very close match for the original. Only a close inspection shows the slightly more square shape.

Entire engines come up regularly on Ebay. You are advised to get a spare pair of HT coils and either a CDI unit (500Z, A, B, C) or spark units (GL500, 500 Eurosport and all 650s). Saddles and Honda original exhaust collector boxes (aka H-boxes) are also rare.

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15 Ok then, what spares should I accumulate?

(*) essential; (+) important; (#) useful

For Z, A, B, C and D models, a **CDI unit**; for all others, a pair of **transistorised spark units** * *starting to get rare*

High tension coils (for CDI or transistorised, as they are different) * *if one fails you are reduced to* *being a CX250*

Saddle (Z=A=B; C, GL and EC are all different) # *rare, and the steel ones rust and disintegrate*

{ Exhaust collector box, also known as H-box * } all the **exhaust components** are rare
{ Downpipes +
{ Silencers +

Side panels (Z=A=B; C, GL and EC are all different) # *you can lose or break one*

Rocker box cover retaining bolts (Z=A=B=C=D=GL; EC500s = all 650s) + *these snap sometimes and you can't ride unless the covers are secure*

Gear lever and **rear brake pedal** (Z=A=B; C, GL and EC are all different) # *easily accident damaged*

Swinging arm (Z=A=B=C; all ECs and GLs are the same) + *these rot underneath and spares are scarce*

Water pipe **retaining arches** (pair) + *these are esily broken and hard to find as they are unique to the CX/GL*

Headlight and chrome ring (Z=A=B; C; EC500s = EC650s; GLs) # *rare*

Stator (Z=A=B=C with advance pulsers; others, without) # *even if it's a dead one, you can get it rewound in advance, ready for a stator change*

Rear engine case # *as you can fit it with a new mechanical seal and stator in advance of a triple bypass, saves you days of waiting for parts to arrive*

Left and right handebar **switchgear** (differences are cosmetic, but Z=A=B=C; GLs, ECs and 650s are the same. Also, the 250 and 400Ts and Ns (Dream, Superdream in the UK) have the same switchgear as the ZABC. Note that different countries have different lighting requirements, for example in some countries the lights have no 'off' switch) #

If you didn't find what you want on this page, browse the main page. If you still can't find the answer to your question, or simply want to comment on the pages, you are welcome to **email me**.

How To Ride *Fast* and *Safe*

Rob Davis, Telford, Shropshire UK

"It's not how fast you ride safely - it's how safely you ride fast."

These pages are intended to be printed and studied by motorcyclists wishing to increase their riding skills. It will be necessary to practice these techniques out on the road.

Although I hope that the basic principles of advanced riding are clear enough to all readers, note that here in the UK we ride on the ***left*** hand side of the road. ***All the instructions on this website refer to UK roads***, and any signs etc in the photos are all from the UK. Whilst Eire, Australia, New Zealand and Malta, plus some others, also drive on the left, readers based in countries which drive on the right hand side of the road will need to make the necessary "right" and "left" translations. As for the photos and diagrams, try reversing them in an electronic paintbox!

I am very receptive to comments and suggestions, but you use these pages entirely at your own risk.

The section covering *Riding In Convoys* is at the end of these pages.

Phooey

"Yeah, yeah. I don't need any of this rubbish. I've been riding / driving for 15 / 20 / 30 years and I'm an experienced, safe rider."

All I can say is, "With respect - we can still improve your skills."

"I've seen these so-called advanced riders. They ride like ninnies on a picnic outing."

Even if this was true - which it isn't - rather a ***live*** ninny than a ***dead*** hothead.

I used to think just that, even as a Silver (Intermediate) Instructor, well versed in roadcraft. Then I took the course to qualify as an Advanced (Gold) instructor, and it was a real eye-opener. I learned more about roadcraft from my training officer (Keith Hart of the West Midlands Police) in two weekends than in all the rest of my motorcycling career. I learned to apply procedure to cope with hazards, allowing me to recognise them. I learned about positioning and how vital it is. I learned how to ride like a police officer, and how all those things made other road users see me.

After I'd finished, and passed, I rode the way that Keith taught me. I can tell you that there have been three definite occasions *(two were on the same trip)* when if I had not been riding to this standard, I would have been killed, or at least seriously injured. And, countless - probably on almost every ride - incidences when riding to this standard has prevented a mishap or minor accident.

The weekend after I passed, my MD followed me into work. As we were parking up and walking inside, he said, ***"Hey up Rob, you ride just like a copper."*** If that isn't the highest praise possible, I don't know what is.

Don't just believe *me* - here are some comments from readers

"Excellent! Should be required reading for ALL drivers. Two-wheel or four. Or eighteen! It all makes perfect sense. Especially the "overtaking" procedures ... starting from close behind is *exactly* the wrong way to do it ... I love the "only a fool breaks the two-second rule" ... a most effective resource. Too bad most car drivers don't think like you." **Peter McLennan**, Creston, BC, Canada.

"This is just a note to let you know how much I have enjoyed your web site and various postings on the web ... I attended the American version of what you used to teach. " **Gene**.

"A good read Rob ... you might want to take a second look at the diagam annotation regarding disappearing points / judging tight bends. The first letter on each of the labels appears to be in between two [b]rackets - I asked myself the first time I read what the earside was!! *[this was deliberate - author]* Other than that it all seemed sound advice. Ride Safe." **Skippy**, Exeter, UK.

"As an Australian motorcyclist of more than a couple of years experience I congratulate you on your safety page. We are taught some of the stuff when we do our licence test, not all of it ." **Dave Price**, Australia

"Just read your section on Advanced Riding and it's excellent." **Dave Money**, UK

What makes me qualified to preach this doctrine?

Both as a motorcyclist of 34 years' standing and as a former Star Rider Gold (Advanced) Instructor (AMI 2983) and as a former Part I Test Examiner (AME 2983), I have taught riders from absolute beginner level to the standard required to obtain the highest possible civilian motorcycling qualification.

I ran two Star Rider centres in Leicestershire UK (Hinckley and Market Harborough) and would be pleased to hear from former trainees, or fellow instructors of the sadly defunct National Motor Cycle Training Scheme.

As little boring text as possible

I'm not giving you 5,000 words on how to change gear and I am not going to waste your time and patience going through the sometimes pedantic "Police Roadcraft System of Motor Cycle Control". Instead I'll explain each topic, simply and in turn.

"Nearside" means the side of the vehicle closest to the verge or kerb. In the UK, this means the left hand side of the vehicle.

"Offside" means the side of the vehicle furthest from the kerb. In the UK, this means the right hand side of the vehicle.

Headlights

In some countries, daytime headlights or running lights on motorcycles are compulsory, but here in the UK they are not. I don't think daytime headlights make any difference at all to being seen, and they serve only to annoy other road users. Also, it is far more difficult to judge the distance and closing speed of a bike when all you can see of it is a blazing headlamp.

I don't ride with lights on in broad daylight because I know that positioning and roadcraft are three times as effective at ensuring that (a) I see other road users, (b) they see me, and (c) I am somewhere else when an accident occurs.

When should you show headlights? Easy. ***When you wish other road users would use theirs***. And, NEVER run on sidelights. Dipped headlights or nothing, please.

Hazards

You'll read a lot about hazards, so let's clarify what constitutes a hazard.

"A hazard is any condition or circumstance where there is an increased possibility of an accident occurring."

Examples

Condition or circumstance	Why it's a hazard	What to do about it
Junction	Vehicle pulling out in front of you	Position yourself to see and be seen; be ready to slow down, take evasive action, or even to stop.
Distancekeeping	Vehicle in front may suddenly brake hard	Keep your two second safety distance (details later)
Entering motorway from slip road	You may be hit from the offside quarter	Lifesaver before entering traffic flow
Hump backed bridge	You can't see what is coming or what is on the other side of the hump	Slow, controlled approach; sound horn; assume there is something that will hit you until you can see that there isn't
The last 3 miles before arrival at destination	You're tired and looking forward to that cup of coffee	Concentrate harder. Forget the coffee. Think about the roadcraft.

What are we trying to achieve with these techniques?

The end result of applying these techniques is a smooth, unflustered ride, giving yourself (and perhaps a pillion passenger) a clean, smooth, apparently unhurried ride, without harsh acceleration, braking, or manoeuvring.

Once you understand, have practiced and mastered the points I give you, you'll be astonished at how much more progress you can make with much less effort. You won't be caught out by sudden bends, drivers pulling out in front, you won't misjudge bends, and you will make extremely smooth progress through traffic, particularly in urban conditions and whilst overtaking.

If you're still thinking *"Yeah, yeah, what can a few simple techniques do for me?"* all I can say is, trust me, and apply the ideas. They really do work, and they're not awkward or complicated to use.

Even if this prevents one single incident, isn't it worthwhile? Also, with practice, you can learn to make 1000cc progress on a 500, work less hard and stress your bike, yourself and your insurance company incredibly less than before. You can ride 250 miles, make far better progress with less effort than before, and still be fresh and ready to do it again if necessary.

I was once out with a pal (Mark Berry) who had a Z1000, I was on my CX500. On a clear cross country road he streaked off. He wasn't one of my Gold trainees and had no idea how to ride to Advanced standard. After about fifteen minutes of what was, for him, spirited riding, overtaking left right and centre, he looked in his mirror for the first time and saw me still glued to his tail. I will never forget the look of astonishment on his face. When we arrived home he signed up for the Gold Course (and later went on to be an Instructor). He said "I just didn't believe a 500 could possibly have kept up with me." I had certainly worked my bike hard, but I wasn't flustered, and I hadn't taken any risks. Later he said, ruefully shaking his head, "For the first time, I understood how fighter pilots can get shot down without ever seeing the enemy aircraft that got them."

Signals

When you were being taught to ride / drive, you were probably instructed to signal for each and every manoeuvre. However, there is no point in giving a signal when there is either nobody to see it, or nobody to benefit from it. So, in some cases, you will move off, turn, overtake and so on without giving any signals at all.

The general rule is "Only give a signal if it would benefit someone else." Any signals you do give should be given in plenty of time, be clear, and be cancelled after use. Also, on a motor cycle, a confirmation arm signal is occasionally useful. For example, when approaching a left turn where another vehicle is about to emerge. The other driver should not assume that you really are going to turn left, and should wait until you have committed yourself to the turn before pulling out. If you give an arm signal to support or reinforce your normal signal, this is unmistakeable - you can't leave your arm sticking out by mistake, the way you might leave a turn signal running.

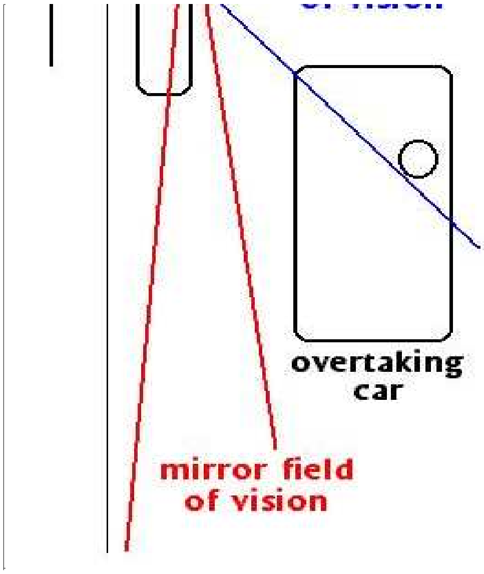
Arm signals are done "from the elbow" like a Royal Wave. Don't stick your entire arm out, and don't look over your shoulder during an arm signal. If you should hit some debris in the road, you need both hands on the controls.

Personally, I would not signal to overtake a parked car, because I am clearly not going OVER it but AROUND it. Also, I don't signal to pull back in after overtaking - this is completely unnecessary.

Don't waste effort giving unnecessary signals. If the road is empty, or other traffic is so far away as not be able to benefit, don't bother to give that signal.

Observation

We don't call it the "Lifesaver" for nothing!



Look over your shoulder before you move off, turn, overtake, and before any manoeuvring. Your handlebar mirrors have serious close-up blind spots and they won't show the vehicle that kills you when you turn into its path.

Typically, this is when you turn right into a side road as another vehicle overtakes you. Or, on exiting a motorway onto a slip road as some prat overtakes you on the inside. Not your fault, but wham! *(Note that, contrary to the US, in the UK it is illegal to overtake on the nearside, unless the target vehicle is turning right, or you are in slow-moving lanes.)*

Use your mirrors, yes - even fit accessory-type wide angle mirrors - but ***use the Lifesaver before turning***.

Stopping and Moving Off

These instructions are for a "normal" left foot shift bike. If you happen to ride a right foot shift bike, you need to reverse these lefts and rights.

Stop using ***both*** front and rear brakes, and with your ***left*** foot down, giving full control over both both brakes.

Change feet and select neutral. Hands off, but if you are on a slope, keep your righthand in place, and use the front brake to hold the bike.

When preparing to move off, select first gear, change feet (change brakes if on a slope).

Move off, covering the rear brake.

Why? So that you can stop suddenly on the rear brake, if you need to. Someone jumping the lights maybe? I hear you saying *"Yeah, yeah, but I can control the throttle and front brake at the same time."* I'm saying, *"No you can't, not safely."* Why take the risk?

This manoeuvre is called the "Hendon Shuffle" as it was allegedly developed by the Hendon Academy (Metropolitan Police) riders. Using it is a dead giveaway that you are an advanced rider.

Dave Price comments "We [in Australia] were taught the Hendon Shuffle, but then to wait in first gear, to be ready to move off in a sudden emergency, such as a driver behind not stopping - and you hear that dreaded squeal of tyres behind!" The answer is that waiting in neutral prevents your bike from launching itself, if you are shunted or struck from behind.

Distance Keeping

This is the easiest one in the book. When the vehicle in front of you passes some visible point such as a crack in the road surface, a manhole cover, a traffic sign etc - say ***aloud*** to yourself:-

In the rain, you can add ***"... when it's pissing down with rain."***

Or you can add ***"... when I'm tired after a long ride."*** etc to increase the safety margin.

If you have reached the visible reference point before you have completed the doggerel - well - no prizes - you are too close. ***Back off***. Works in your car as well.

I'm being tailgated, what should I do?

Firstly, give the driver behind a clear *"please back off"* signal, "pushing him away."

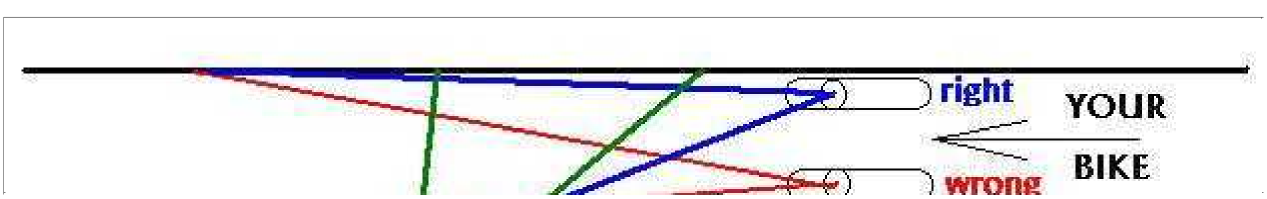
If this doesn't work, whilst it's tempting to slam on the brakes and then accelerate smartly away, there is a much more subtle method. Stay in your normal riding position on the road (2/3 out, see next section) and gently slow down, forcing the other driver to slow as well. Don't look behind, use the corner of your eye in your mirror. When you have opened up a nice gap in front of you, accelerate quickly away up to your safe distance. It's rare to need to deliver more than 2 doses of this to the driver behind.

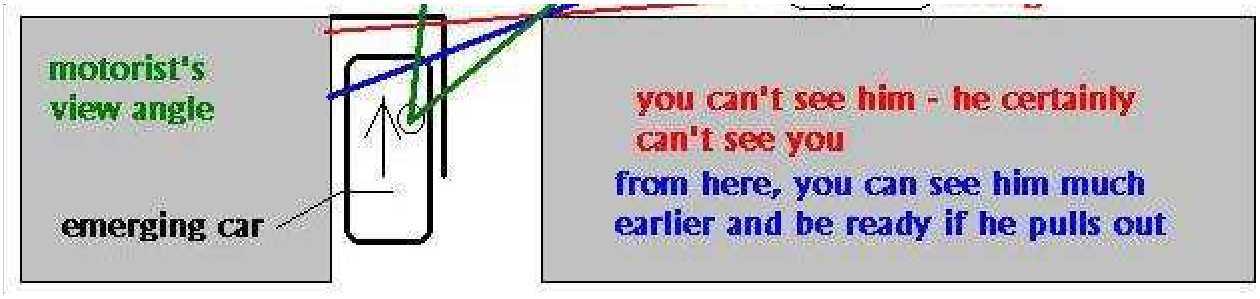
Positioning

For normal riding, you should be 2/3 of the way across from the nearside of your own lane. Why? Because then you are master of your own patch of road. Ride 1/3 or 1/2 way out, and you leave a gap just inviting someone to overtake and snick past you when there isn't room; and bump you off your bike. Also, and more importantly, from here you are much more visible to other road users.

Junctions - side turnings

When approaching a left side turning, look into it. Is a vehicle emerging? Remember that you will see the bonnet (*hood* to Americans) of his car long before he can see you. So move out to the crown of the road - increase that angle of view into the junction. You'll see him better. He'll see you earlier. Diagram below.





You can apply this positioning technique to ***any hazard where you will benefit from an increased depth of view*** into or around the obstruction. Typically, at the approach to a crossroads, where being at the crown of the road not only improves your depth of view into the hazard, but also makes you far more visible to anyone thinking about pulling out.

Keld Petersen comments "One more reason to be at 2/3 (at least). You have to ways to to turn if something suddenly appears in your way (very important here in Sweden where we have animals (sometimes big ones) coming up on the roads). although when its raining the 2/3 often is in the worn down tracks from cars, where water gathers. Then I choose to either go 1/2 or 99/100, depending on traffic."

Hey! Here I Am!

Has that motorist seen me? (You know that the other motorcyclist did, because he nodded back at you, right?) But what of the car driver? Is he going to pull out in front of you from that side turning?

1. *Watch his wheel trims*. If they move even a fraction, you'll see this movement far more easily than any other tell-tale sign.

2. *Watch his eyes*. If he has seen you, you'll probably see him see you.

3. *I'm not sure he's seen me*. Stare at him. Hard. Square your helmet at him, and glare. Give him the Policeman's Stare. It works, believe me.

4. In a situation where you want to improve your chances of being seen, it's permissible to gently weave your bike from side to side, to make you "move about the road" more. This extra motion does make you stand out better, and is useful when approaching a junction where you can see vehicles emerging. It's the ***opposite*** effect to a hunted animal keeping still and avoiding being seen.

Oh yes, whilst I remember, horns are warning devices, not gun buttons.

Traffic Flow

Another hallmark of a well trained rider is the ability to merge seamlessly with traffic flow, particularly at junctions and roundabouts. This is done with observation and anticipation and allows you to make far better progress, with far less effort, than untrained riders.

At the approach to a roundabout, look carefully at the traffic flowing from your right. You can't

always make this technique work, but try to coincide your arrival at the entrance to the roundabout with a suitably sized gap in the flow of vehicles already on the island. This is done by careful observation, gentle and subtle control of power and brakes, remembering that you want to get as smooth a flowing ride as possible. If you time this arrival correctly, you will be able to enter and negotiate the island without having to stop.

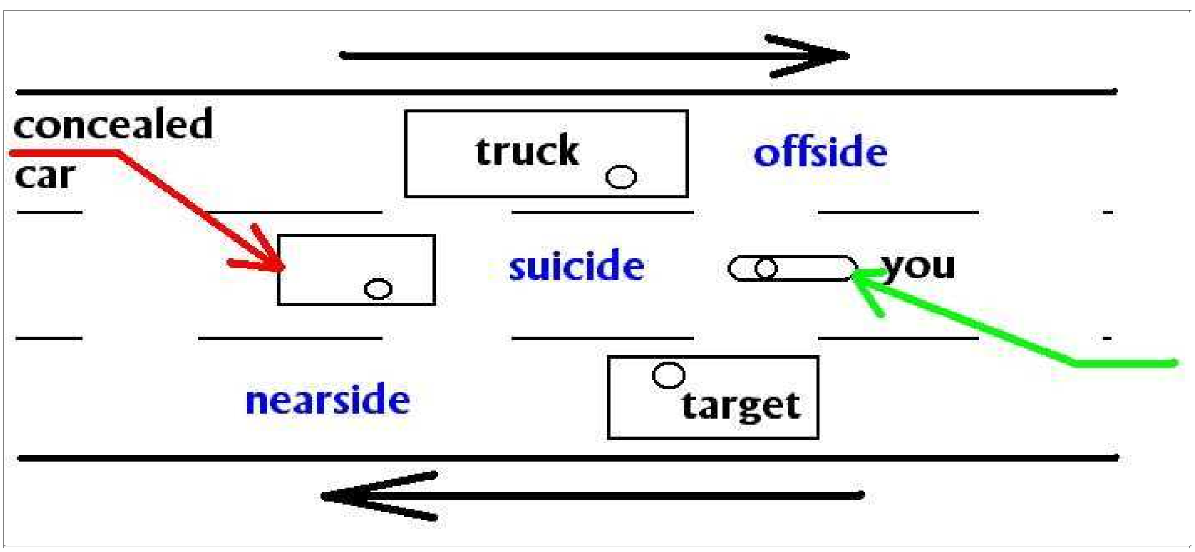
One valuable extra edge here is that if you arrive at the island in time for that space in the traffic, as you are already moving, you will be able to accelerate far more quickly and smoothly than a vehicle which is stationary. This gives you a tremendous advantage over what may well be a more powerful vehicle. Plus, it gives you, and your bike a clean, smooth ride.

The same technique is also applied to traffic lights which are on red as you approach. Slow down smoothly and trickle up to the stop line or the stationary vehicle in front. Careful observation of the lights controlling traffic in the opposite direction, and / or of the Pelican pedestrian lights, give you an edge in judging when your lights will change to red+amber, then green.

Again, arriving at the stop line at the exact moment the lights go green allows you to be still moving - however slowly - and you can easily accelerate away from other vehicles, making far better, smoother progress.

Three Lane Madness : *Nearside*, *Offside*, and *Suicide*

Thankfully, three lane roads have been almost completely phased out in the UK but there are still some places where they persist. Three lane roads are death traps for the unwary rider because whilst overtaking, if anything is coming towards you, it usually conceals any vehicle behind it - which might well pull out and overtake at the same time as you do.



The golden rule here is "never use the centre lane for overtaking, if any vehicle is coming towards you."

We don't call it "***nearside, offside, and suicide***" for nothing!

Cornering

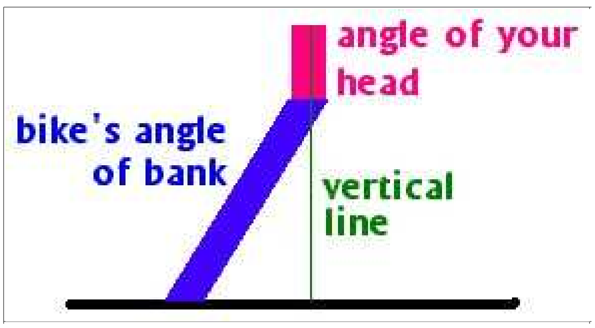
With all manoeuvres, the ***approach*** to it is the key to success. A corner or bend is negotiated correctly if:-

1. You exit it on the ***correct*** side of the road

2. You can ***stay*** on the correct side of the road

3. You can ***stop*** in the distance you can see to be clear.

Angle of Dangle



When cornering, although your bike naturally leans or banks over, always keep your head vertical (left) in relation to to road surface. This maintains your perspective of the bend, and greatly assists your balance.

This is an old Pilot's trick. Next time you are on a fairground ride, being turned this way and that, try to keep the line of your eyebrows as horizontal as possible. It's astonishing how this preserves your orientation. It's rather like the artificial horizon instrument on an aircraft.

How Steep Is That Bend?

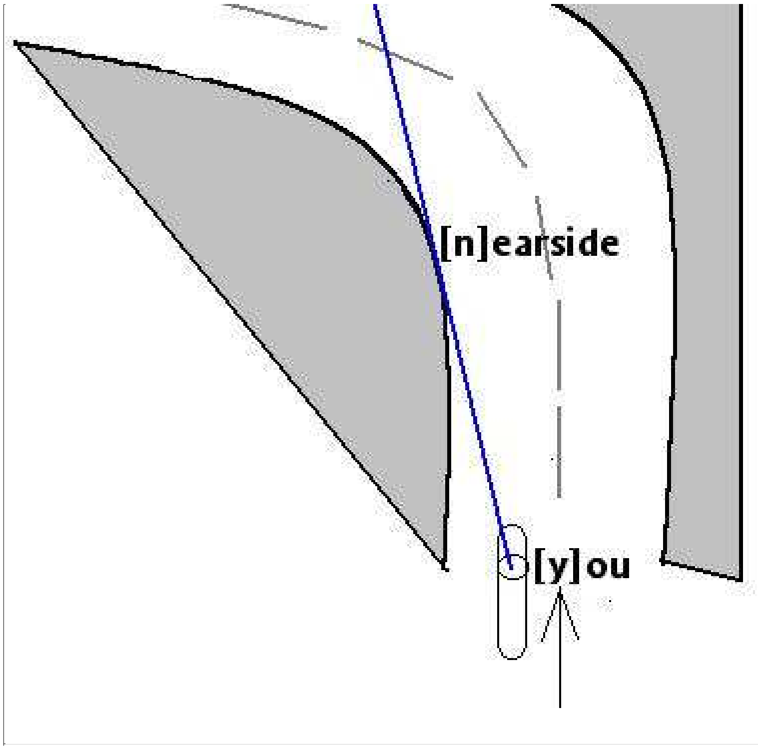
This is easily judged with a little practice.

As you approach, look as deeply into the bend as you can, and assess the depth of your view "gaining towards the farside verge" in relation to how much distance you are "losing as you approach the nearside verge".

The depth of your view in relation to your approach	The bend is
Increasing	Straightening out
Decreasing	Tightening
Constant	Constant

In diagram 1 below, there are two distances to be judged; ***Y*** (you) to ***N*** (nearside verge) and ***N*** to ***F*** (farside verge).

As you approach the bend, the distance between ***Y*** and ***N*** will obviously decrease. But as you look into the ground beyond



the nearside verge, assess the distance between ***N*** and ***F***.

If the ***N-F*** distance is decreasing at the same rate as ***Y-N***, the curve of the bend is steady and constant. I.e. it is not opening up or straightening; if it was, you would be able to see further down it.

If ***N-F*** is decreasing faster than ***Y-N***, watch out, because the bend is tightening. Its curve is increasing so you can't see so far down it.

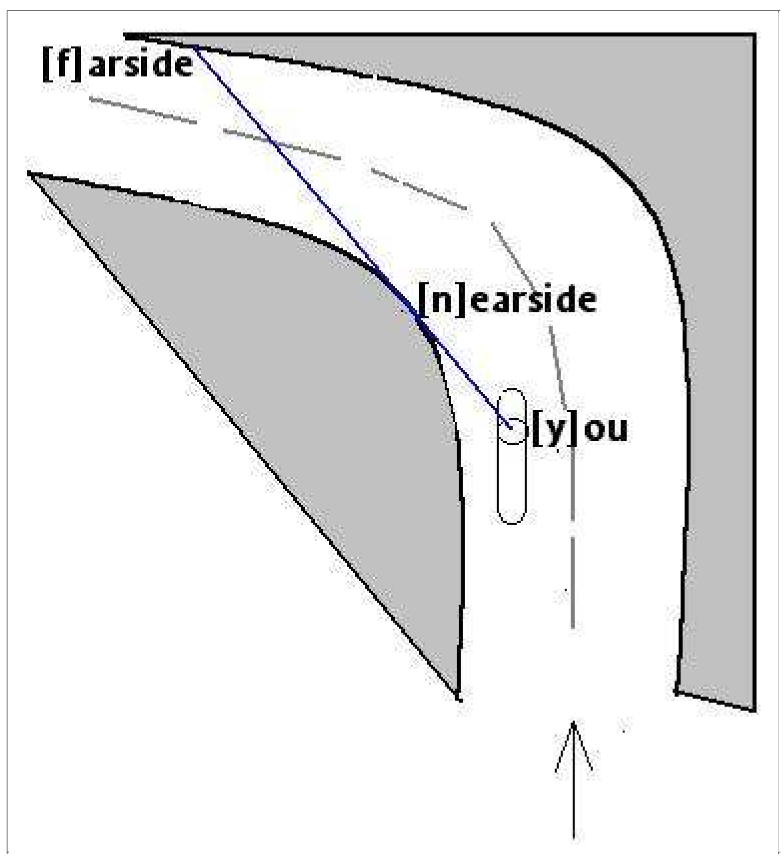
If ***N-F*** is increasing more than ***Y-N*** is decreasing, the bend is opening out, allowing you to see more of it as you approach.

In Diagram 2 the bike is deeper into the bend, which is now opening up, and the ***N-F*** distance is inceasing accordingly.

This is all a matter of practice and experience.

What I suggest is that you take a ride, or even a walk, round some bends you know very well, and try out this method. Believe me, it works, and once you understand it, you will NEVER get taken by surprise by a bend, ever again.

Isn't that a good idea?



Left Hand Bend

REMEMBER that these were filmed on UK roads where we ride / drive on the left. If you ride / drive on the right, put the images into an electronic paintbox and mirror them. Then reverse the "right" and "left" in the text. The techniques will still work.

On the approach, move out to the crown of the road to improve your angle of view round the bend.

WRONG! What can you see from here? Sweet Fanny Adams! You are positioned far too close to the verge. You cannot see around the corner and you don't know if the road is clear. There may be a broken down car, a piece of debris, a pedestrian, or a herd of elephants, just out of view.

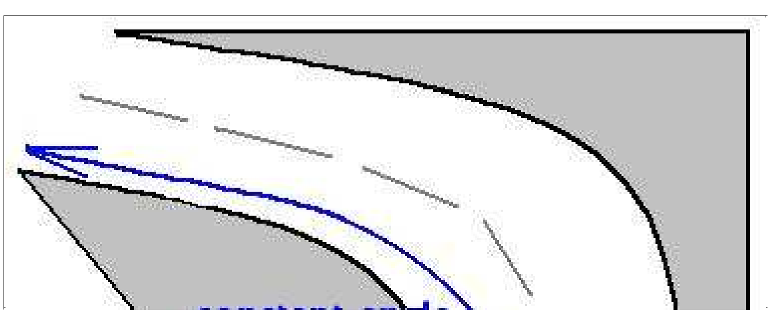
"Round every unsighted hazard is something which is trying to kill me."

And just in case you UK riders hadn't realised, the ***elongated*** white centre lines mean "hazard ahead", in this case, a bend. It's ***amazing*** how many people don't know that.

RIGHT! Exactly the same bend, from exactly the same distance, but from the crown of the road.

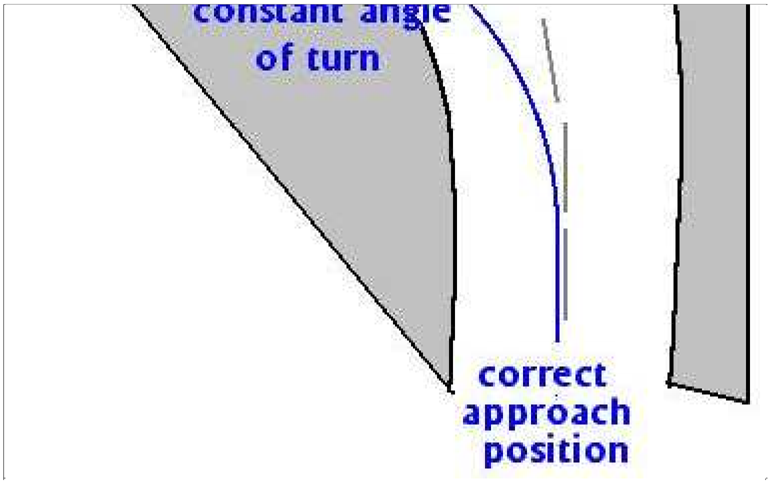
Now you can see that the bend is clear and there isn't a hazard.

What a difference 2 yards to the right (and a litle training and practice) makes!



Get all the braking and gearchanging done on your approach, and then line up at the crown of the road to maximise your view into the bend.

Once you have approached the left bend from the correct position, and seen it to be clear, you will be able to negotiate the



bend at a constant speed and on a constant angle of bank.

If it's clear, bank over and hold the bike at a steady throttle, steady rate of turn and this will make you exit against the verge.

Why? So you and your bike will be evenly balanced on both wheels; you won't have to slow down suddenly, brake, or change your line. Any of these things can cause you to lose control.

As you straighten up, accelerate.

Right Hand Bend

Apply the same principle, but in reverse.

WRONG! Here you have approached the bend from the crown of the road. What can you really see? Something ... but not enough to know that Farmer Jones isn't driving his tractor at 5 mph, just out of view.

Notice the elongated white centre lines again, indicating a bend hazard.

RIGHT! The approach is from close to the verge, and you can see so much further around the corner.

So Farmer Jones's tractor with the long spikes on the front isn't going to get me. Nor are the sheep he is herding across the road.

Also I can see that there is ***another*** bend coming up, and I can get ready to position myself for it.

As with the left bend, get all the gearchanging and braking done in advance, on the approach.

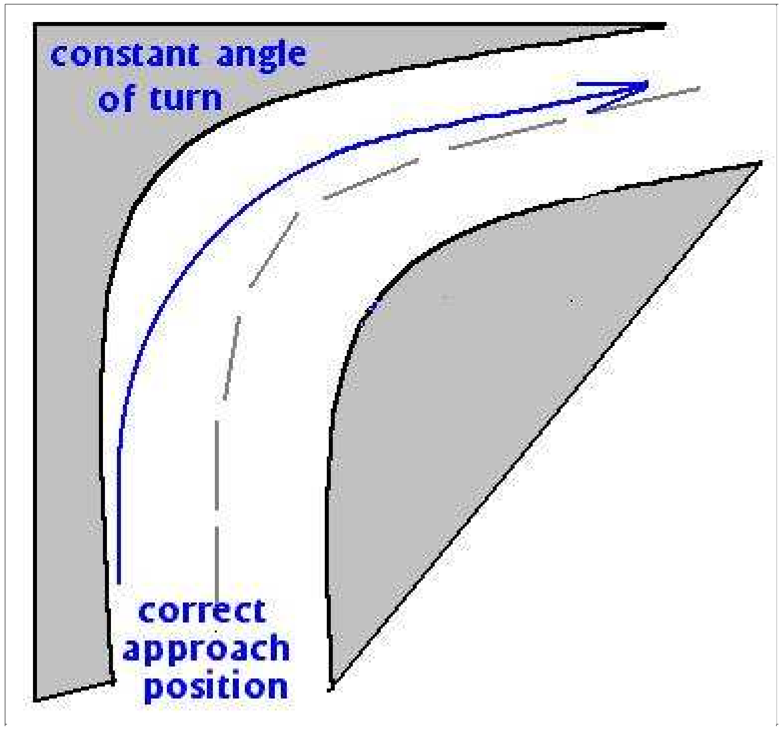
Position correctly against the verge.

When it's seen to be clear, hold speed, angle of bank constant; there should be no need to change anything. You will exit smoothly against the crown of the road, where you accelerate.

Why? So you and your bike will be evenly balanced on both wheels; you won't have to slow down suddenly, brake, or change your line. Any of these things can cause you to lose control.

As you straighten up, accelerate.

Easy when you know how.



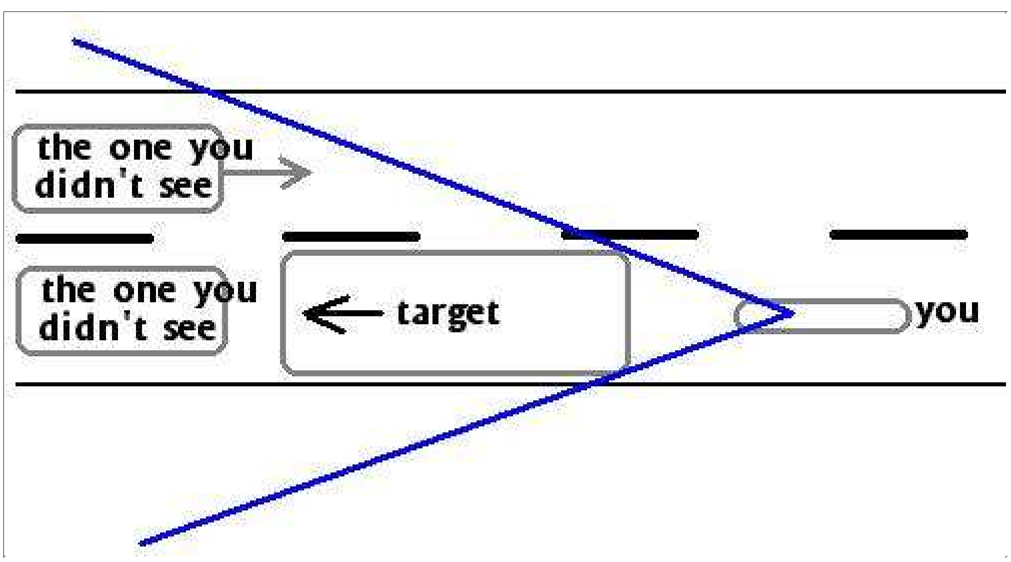
Practice on some bends you already know, then try it on some new roads.

IT WORKS!

Overtaking

First - How Not To Do It

WRONG! Get up real close (*below*) to the vehicle in front. Peer around its offside. When you think it's ok, drop a gear or two, accelerate to the redline and blast past.



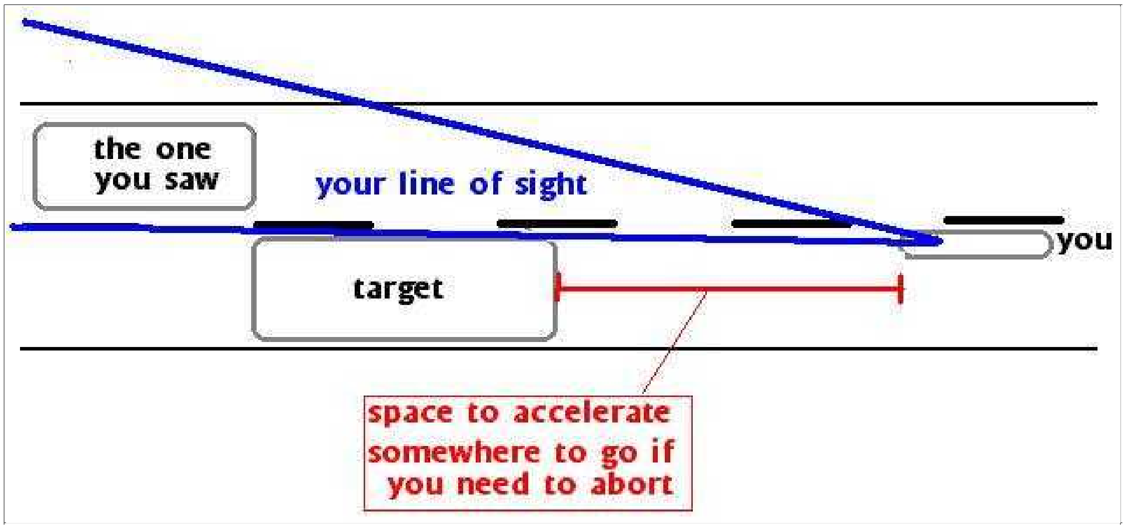
Why not? Firstly, you can't stop in an emergency. Secondly, you can see naff all except the rear of the vehicle in front. Thirdly, you have no room to accelerate. Fourthly, you have nowhere to abort to if you need it. Fifthly, you are treating your engine badly and annoying other road users.

Just ***watch*** the untrained riders (and drivers) too close, dodging in and out, struggling to see what's coming.

Here's How You Do It Properly (below).

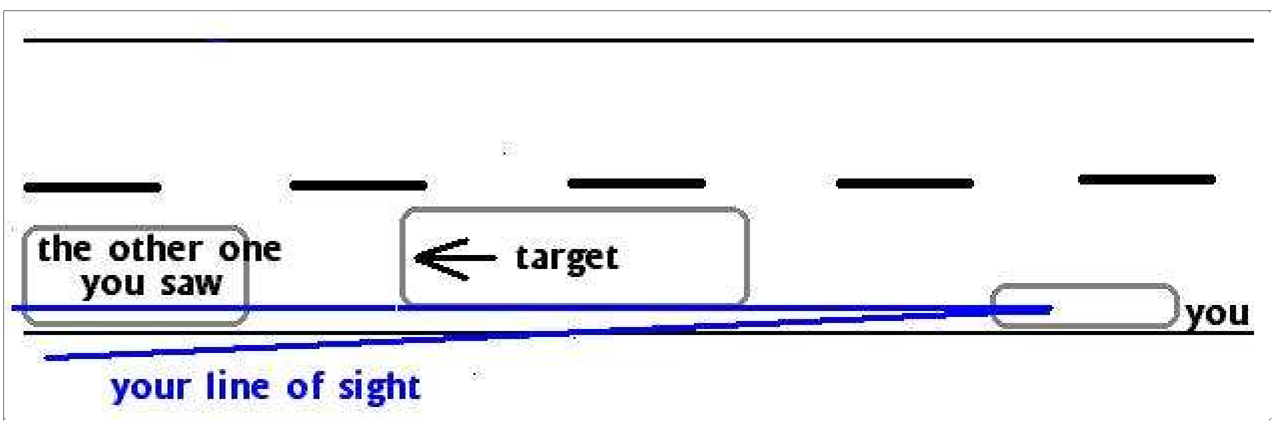
HANG BACK - RIDE WIDE.

Get to your safe distance, or even further back, and you get a wide-angle view of the road ahead..



Why? Because you can ***see***, you have space to ***stop***, space to ***accelerate***, and somewhere to ***go*** if you need it. Also, you are within the mirror view of the target vehicle, reducing the possibility of him moving into your path.

Move to your nearside, and have a good look (*below*) up the target's nearside - can you see another vehicle tucked in front of your target?

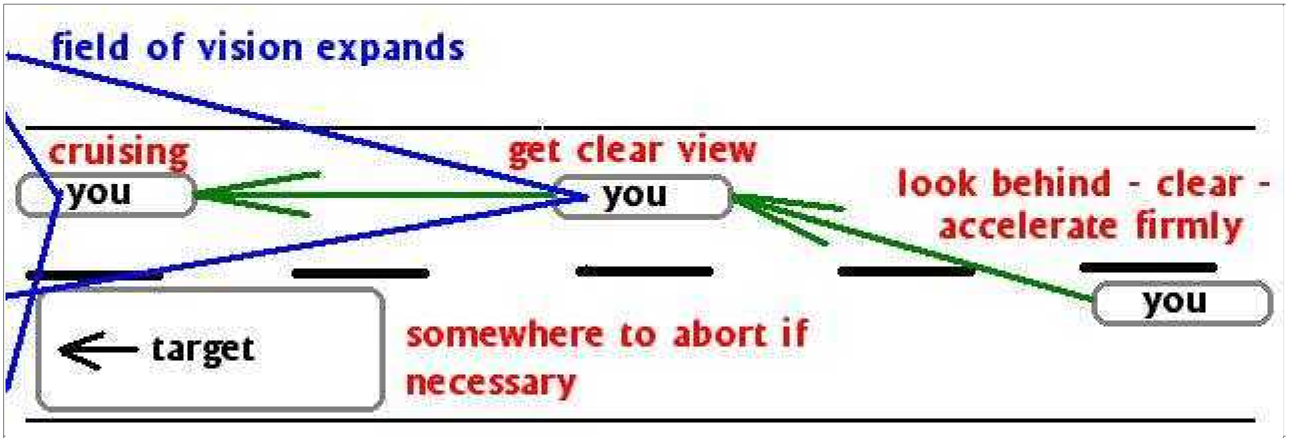


Can you see some hazard such as a cyclist, a bend in the road, a village, a junction or crossroads, in the distance?

What I am saying here is, can you see any reason ***NOT*** to overtake?

Don't overtake over junctions - a vehicle you didn't see may slow down, stop, or pull out in a hurry.

Consider two identical bikes, both at the same speed, one six feet from the target and one fifty feet from the target. They both accelerate together. By the time the rearmost bike reaches the target, he has accelerated far more that the nearmost bike has been able to, because he left room for the bike to pick up speed.



If it's clear, look over your offside shoulder (to make sure nobody is in your blind spot), accelerate firmly and move out to take command of the other side of the road, and if you ride wide, again the view opens right up and you can see what's ahead.

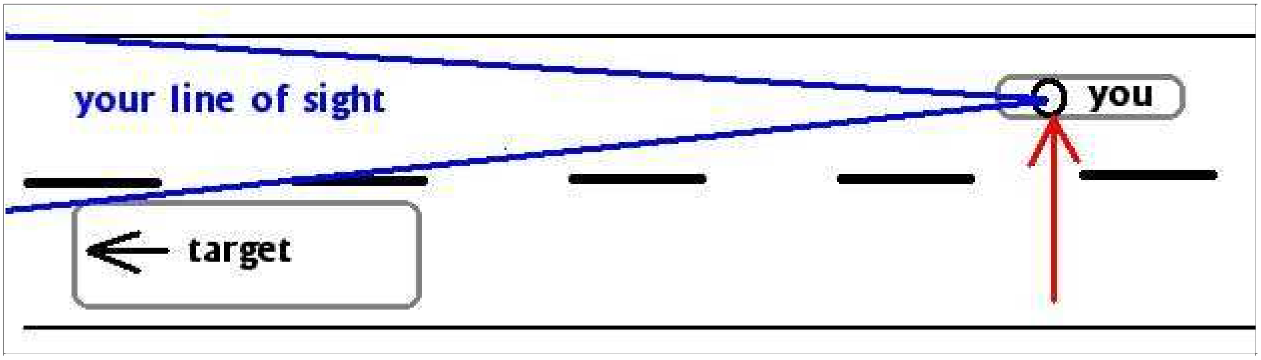
If something unexpected happens - perhaps as the view opens up, some hazard becomes apparent - you can easily slack off the throttle, brake gently, and ease your bike to the left, without mad braking or any panic. Drop back to your distance, and start the overtaking procedure again.

By the time you are alongside the target, you should be cruising not accelerating.

If you think about it, the ***safest place to overtake is a steady right hand bend*** - because you have the best possible view down the road!

An Extra Edge : the Preview

On the open road, whilst looking for the right opportunity to overtake, maintaining a ***long*** safe distance gives you that wide-angle view of the conditions ahead, which is denied to the rider who tries to overtake from up close behind. You can gain an even ***bigger*** advantage by taking a preview of the road ahead.



Check your offside blindspot and if clear, move laterally across the road ***without*** gaining ground. Now you can see so much better. You will get an excellent view from here for a left hand bend, as well as for overtaking.

Some people have seen me do this and said "but you're on the wrong side of the road, that's dangerous." The answer is, "Not as long as you can see what's coming or what hazards are ahead. Also, what's coming can see you much earlier; you can handle the hazards better."

However, don't use this preview technique in urban conditions. It isn't necessary, and there are more problems with it (kids playing etc) than there are on the open road.

Why bust a gut? Do it properly! In my experience, correct positioning and overtaking is worth another 75% engine power.

Practice and Experience

All these techniques are simple and effective ways to prevent you meeting something you didn't know was there, and there are no magic tricks involved. Everyone can do it from a moped to a Gold Wing, and to a lesser extent you can apply positioning to your car driving as well, although you have less road to use, cars being wider than bikes.

Convoys

Participating in a convoy of advanced riders is extremely satisfying. It's the nearest you'll get to flying Red Arrows formation. The nice thing about it is, as you are all riding to the same same standard and applying the same rules and procedures, you'll always know what the others are going to do.

> Agree a ***Ride Captain*** (leader) and Deputy. Everyone should have the opportunity to lead and deputise.

> ***Brief the riders in advance*** on the destination and route. Agree to stop at intervals to allow rests / refuelling / general checks / to change the running order. Give a general mobile phone contact number.

> The ***speed of the convoy*** is that of the slowest bike or rider in the convoy. If you have three GL1000s and a moped, your convoy speed is 30 mph.

> ***No overtaking within the convoy***. If a rider breaks down, all riders behind should stop.

> The ***Ride Captain*** and ***Tail End Charlie*** should be the only two riders ***showing headlights***. If the leader can see a headlamp, everyone is present and correct.

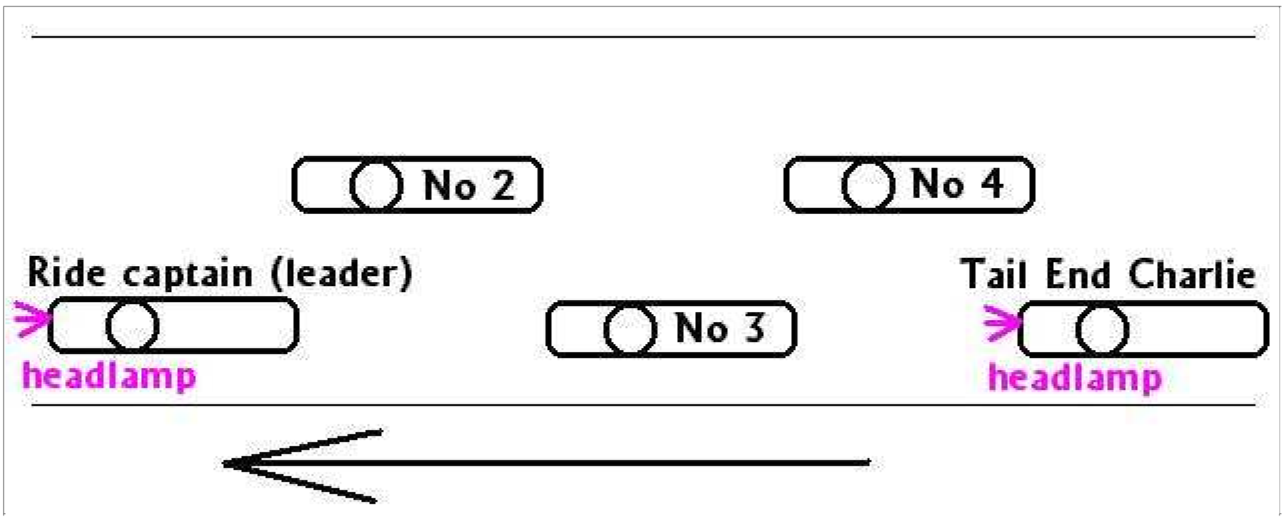
> Most experienced ***navigator*** at the ***front***.

> Most experienced ***mechanic*** at the ***rear***.

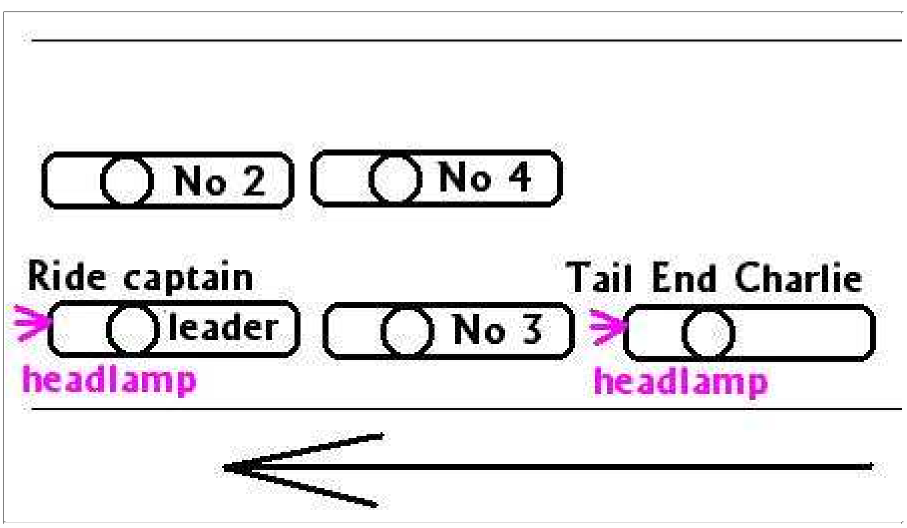
> On an organised long trip, riders will find it advantageous not to double up on the various tools carried. For example, nobody need bring a torque wrench if another rider has one.

(Ever seen any Battle of Britain or fighter-pilot films, or read any of these type of books? The formation used is very similar to the "Rotte" and "Finger-Four" formations perfected by the Luftwaffe fighter pilots, and rapidly copied by the defending RAF.)

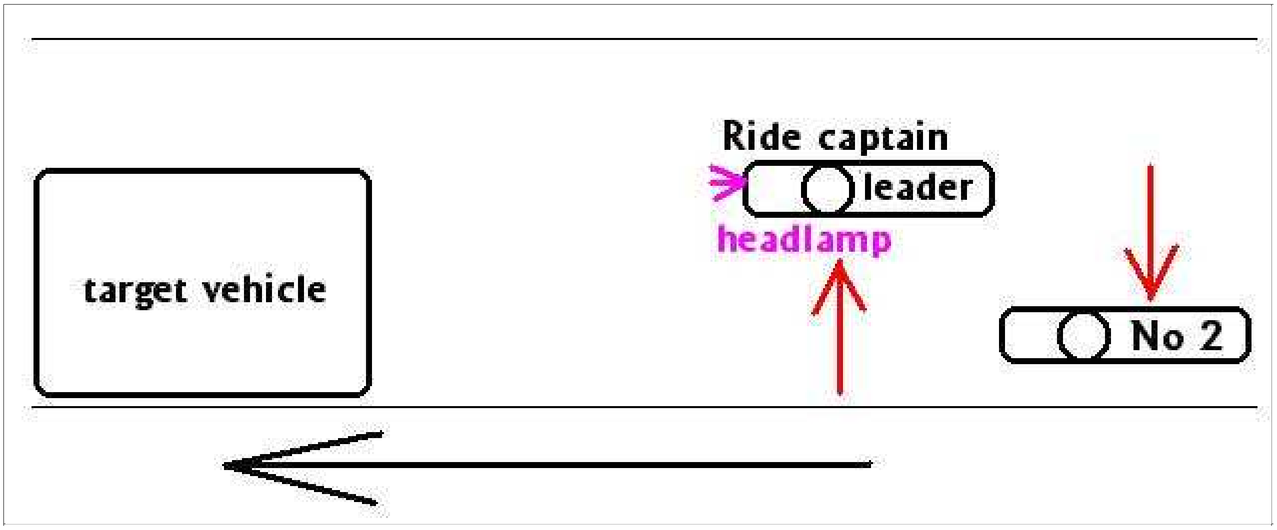
CONVOY : Normal Riding Position is a series of pairs, staggered and evenly spaced (*below*). On the open road, it is predominantly the task of the leader of each pair to watch the road ahead, and for his pair to watch the road behind.



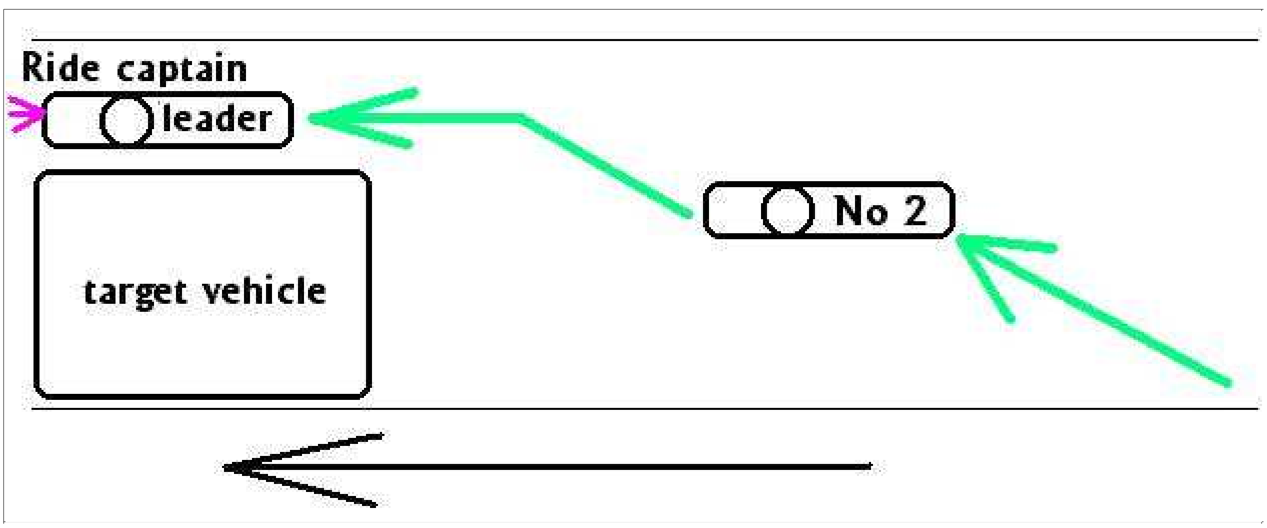
CONVOY : Closed-up position at a stop light or junction (*below*). Pairs draw alongside to minimise the "footprint". This, and moving-off, done as a group, is very impressive to watch from behind, and shows a disciplined, well drilled formation.



CONVOY : Preparing to overtake. (*Below*) The signal to prepare for an overtake is the leader giving a very obvious look in his offside mirror. His No 2 should be ready for this, and they swap positions to give Leader the best view. No 2 watches developments behind, warns Leader by horn if hazard develops.



CONVOY : Overtaking pair by pair (*below*). Leader overtakes. No 2 moves to overtaking position, to get best view. Leader, if safe to do so, gives Clear Road Signal (explained in next section) once he has completed the manoeuvre.



On a motorway or dual carriageway, the technique is slightly different. On seeing the preparatory signal, the two riders don't swap places. Instead, No 2 checks behind and moves out into the next lane, without gaining ground , to "hold" the lane ready for the leader to come out. However, what you can't afford to have happen here is for another vehicle to slot in, in front of No 2 after he has moved out, as there is a possibility of a collision between No 1 as he comes out, and the vehicle which slotted in.

Clear Road Signals

When riding in pairs or a group, it is often necessary to overtake as a queue, and then wait for the rider(s) behind. This is simplified if the rider who has just overtaken, and who can see more of the road ahead than anyone else, gives a Clear Road Signal. This is simply the left (clutch) arm raised fully above the head. This means ***"I can't see any hazards from where I am."*** He then maintains his line of sight to the rider who is next in the queue, and does not zoom off far ahead where the next rider can't see him.

The next rider to overtake, however, must *himself* make the decision to actually overtake.

The rider giving the signal should hold his arm up whilst the road is clear, but snap his arm down the ***instant*** he sees a hazard ahead. Given that all riders trust one another and ride to the same standards, the Clear Road Signal is a great help to those behind.

In a group situation, a clear road signal can be repeated "down the line" from No1 to No 2 to No 3.

Inter-rider Signals

We can't all afford helmet-to-helmet radios ... so ...

Bike at roadside with helmet against rear wheel means **"I need assistance."**

Rider ahead raising left (clutch) arm fully is the Clear Road Signal and means **"I can see no hazards."** The arm is rapidly withdrawn at the first sign of a hazard.

Index finger raised at arm length and rotated means **"Start your engines."**

Clenched fist raised to arm length and pumped up and down means **"Stop your engines."** This is more visible than a "throat-cutting" signal.

Thumb and forefinger joined in an "O" means **"Are you ok?"**

Thumb up means **"Yes."**

Thumb down means **"No."**

Palm down and hand rolled from side to side means **"I am not sure."**

Fist clenched means **"I want to stop."**

Exaggerated scratching of helmeted head means **"Which way at the next junction?"**

Hand extended rearwards, with fingertips alternately meeting and parting (like a flower opening and closing) means **"You (or someone else behind) has left an Indicator running."**

Go To It

Ok - now go away and work at it. You are welcome to **comment** on these pages.

Buying a CX500 or one of its family

I will assume that you've checked that the seller has good title to the bike and that the engine and frame numbers correspond with the registration document (V5 in the UK). Verify the mileage on the odometer with at least one MoT certificate. A conscientious owner will keep all the old MoTs to show that the mileage is true.

The most imprtant thing to bear in mind is that with a bike this old, there are bound to be things wrong with it, or there are bound to be "things that need attention". CX and GL owners don't die of boredom ... forget any dreams about finding a mint condition CX which looks as if it just came out of the crate. Any bike which has been kept outside without a cover, will have corroded metal parts and generally look tatty. Even a 25 year old bike which has been well looked after will have some battle scars. All and any such defects and problems should be reflected in the price.

Personally, I would not buy a vehicle without an MoT certificate of less than 6 months remaining life. If I really wanted the vehicle, I would be prepared to pay for the cost of a new MoT test, but not any repairs that were required to pass it. One way to detect a dodgy bike with hidden faults is to make this offer - if the seller stalls or backpedals, walk away from the deal.

NEVER buy from a man in a pub. Always go to the seller's home. If the address on the registration document does not match the address where the bike is, ask the seller for an explanation. In the UK it is illegal for a trader to advertise a motor vehicle for sale and make the advert look like a private sale. This is because a trader has to comply with legislation such as the Sale of Goods Act. A private sale is a case of ***Caveat emptor***, roughly translated as "Sucker, beware!"

If you can, take a knowledgeable friend along, who can look dispassionately at the bike and offer a second opinion of it.

If you phone up about a bike for sale in the paper, always say "I'm interested in ***the bike*** in the paper." If the seller says "Which bike?" he is probably a dealer; ask him if he is, or if it's a private sale. The local Trading Standards Office will be very interested in a breach of this law.

If it's pre-1981 (i.e. a CX500Z; in the UK an 'S' or 'T' registration), see if it has the two or three punch marks (left) adjacent to the engine number on the lower left crankcase, to show that the cam chain tensioner modifications were carried out. Even better, inspect inside the rear casing with a dental mirror and a lamp, to make sure that the long plate has been fitted, as per the **camchain components** page.

(Thanks to John for the clear photo.)

The engine should be stone cold before you try and start it, and then start cleanly, no shushing back through the carbs, and not smoking once started. They often only start on one cylinder (usually the left one), this is not particularly a problem, as long as the other one chips in soon afterwards. Nobody seems to know why this is, although one theory is that when parked on the propstand, fuel drains out of the right hand carburettor.

All the electrics should work; here is the checklist (remember that some countries have different lighting requirements): front sidelight / front dipped headlight / front high beam / headlight flash button / both rear sidelights / both rear brakelights on the front brake / both rear brakelights on the footbrake / horn / all four turn signals / starter button. On the instrumentation : neutral light / oil pressure warning light / high beam warning light / left and right indicator lights / instrument backlight for both speedometer and tachometer. Trip counter should reset. When in gear, the starter motor should not operate until the clutch is pulled in.

The cam chain and tensioner should last at least 25,000 miles and many go as far as 40,000 miles. Mechanical water seals do about the same mileage, if proper quality silicate-free antifreeze and distilled water are used in the radiator.

Decoking shouldn't be necessary until the engine has done at least 40,000 miles.

To ***listen to the interior parts of the engine***, start it and let it idle. Put a long screwdriver or socket extension at the following places, and put the other end right into your ear. You can also use a child's play stethoscope to good effect! When listening, regular whirrings and rolling noises are ok, knocking and serious scraping are bad signs.

There are mp3s of the various engine sounds - **Warm Start** **-** **Cold Start** **-** **Camchain Rattle** downloadable, thanks to Randy C. Will for the storage link.

> chromed cylinder head cover bolts (worn valve mechanism)

> inlet manifolds (ditto)

> exhaust manifolds (ditto)

> as deeply between the V at the top as you can reach (camshaft)

> on the cam chain tensioner locknut (cam chain and tensioner apparatus)

> water pump casing (camshaft and impeller)

> clutch casing (clutch bearing and gearbox)

> the 17mm head inspection port under the radiator (crankshaft)

> very low down on the bottom "corners" of the engine (big ends)

> at the base of each barrel (big ends and crankshaft)

Particularly check for:-

> cam chain ***tensioner bolt not tightened*** up (thread stripped, big job) or clearly vibrating loose.

> coolant ***weeping from under the water pump*** cover (failed mechanical seal, big job). Especially check, after a test ride, for coolant leaking from here, over the rear left crankcase, starter motor, and H-box. It's almost impossible to mask this if it's happened. You'll see traces of the brown stain in various nooks and crannies. Some unscrupulous owners will block up this hole using epoxy or sealant - we've had one case where the previous owner had stuck a steel rod up the hole to conceal the water leak! So use a small mirror to examine the left underside of the water pump area, right up against the rear casing.

> take a multimeter and read the blue and white wire ***stator voltages***, as per the **stator web page**.

> a ***rattle which goes away after 3,000 rpm*** is probably a worn cam chain, as above these revs the engine itself will keep the cam chain taut.

> To check the manually adjusted cam chain tensioner life, rustle up a dental mirror (as per my **toolkit** page) and a torch, look inside the rear crankcase timing port. Or feel with a fingertip. The adjusting quadrant should have at least ***1/4 of an inch of its slot visible*** above the locknut. If there is no visible gap, the adjusting arm is at or near the end of its adjustment and soon you will need to change the cam chain and tensioner. Unfortunately this check does not work with an automatic cam chain tensioner (500 Eurosports and all 650s), and with these models, you can't tell the wear rate without an internal inspection.

> Another way to detect a worn cam chain on Zs, As, Bs and GL500s is to peer behind the radiator at the fan, which is attached to the front end of the camshaft. Put the bike in 5th gear and very gradually wind the engine to and fro by nudging the rear wheel. There should be ***no movement of the flywheel***, visible and feelable through the timing aperture, ***without a corresponding movement of the fan***. If there is slack in the cam chain, the crankshaft will be able to move a fraction without a corresponding camshaft / fan movement. This trick does not work with the electric fans of the 650s.

> ***No oil should be visible*** floating on top of the water, at the radiator cap.

> ***No water or white froth or scum*** should be found on the dipstick. If you find slimy yellow "mayonnaise" on the dipstick, or inside the rocker covers, there is a coolant leak, probably a failed mechanical seal or a blown head gasket.

> Check the soft ***12mm oil filter bolt isn't rounded*** off, or that the filter housing has been spotwelded to the bolt. If so, it's not serious but you should replace them.

> Stand the bike on its mainstand and align the steering with the back wheel, you should be able to see ***all four wheel or tyre edges in a dead straight line***, this is a good check for a bent frame.

> Check all 4 of the ***14mm engine hanger bolts are tight*** just aft of the radiator, as the aluminium of the engine tends to crack, or the threads tend to strip, and the crankcase where they bolt into can't be easily repaired.

> Check that the left and right ***cylinder head cover chromed retaining bolt holes aren't stripped***. If they are, the covers cannot be tightened down. It is almost impossible to conceal the resultant oil leak from between the covers and the cylinder heads or from weeping out of the spark plug water drain hole. Having to rethread these bolt holes is a common task as the engine ages.

> Check ***front pistons on brake calipers are not seized***, run chalk lines out from the centre of both faces of the discs, and spin the front wheel (or just push the bike along), gently squeeze the brake, all lines should be worn off equally.

> Rear brake - check the ***adjusting arm is not moved*** round (a cheat to extend brake life). Looking from alongside and underneath the left silencer, the forward angle between the actuating rod and the chrome brake arm should be visibly less than 90 degrees, i.e. the junction of these two parts should be well behind a vertical line from where the chrome arm enter the brake hub.

> ***No oil leaking from the underside of the shaft hub***, at the rear wheel.

> Hold the front brakes on hard, and pump the front forks up and down; there should be ***no oil leaks or smears around the chromed fork legs***. Particularly check this after a test ride. The

chrome on the upper fork legs should not be pitted. (Stained aluminium parts like fork lower legs are easily polished up, though.)

> Underside of the ***swinging arm should be clean and rot free*** (expensive replacement).

> ***Clean gearbox selection***. They do tend to jump out of 2nd, particlarly under a lot of power. No shaft drive sounds are normally audible, and the actual shaft is virtually unbreakable.

> The engine sounds very lumpy when cold, but purrs when hot, I can send you WAV or MP3 files of a cold and warm start if you want to know what it should sound like.

> No ***catching or grinding noises from the fan area*** (fans can break, or dislocate from their hub).

> Poke a thin wooden stick through the dipstick hole and into the sump and have a fish about, is there ***debris or muck at the bottom of the crankcase?*** Shows neglect in oil and filter changes.

> When fully warm, the engine should ***idle absolutely comfortably at 1,100 rpm***, struggle as you lower the tickover to under 750 rpm and stall if you go much lower. The flywheels are very heavy and it needs to idle at about 1,100 rpm (needle just over the tip of the 1 on 1,000). A really well maintained engine, with freshly balanced carbs, will idle as low as 600 rpm when fully warmed up.

> On revving after that, the ***engine should pick up without hesitation*** and rev freely to well over 7,500 rpm to check for stator failure (sorry, neighbours). Stator or coil failure shows on a road test as hesitation or bogging at about 5,500 rpm.

> The ***temperature gauge***, when the ***engine is fully warm***, should be pointing ***straight forwards over the front wheel*** and should not climb more than 2/3 of the way clockwise. Under normal circumstances the temperature never goes much higher than the 12 or 1 o'clock position, and if it does so in traffic in hot weather, it should go straight back down again once the bike is riding normally. A fault here is probably the thermostat, an easy fix, but the radiator may need reverse flushing and de-gunging (again, an easy fix). However if the radiator itself leaks, this is an expensive problem, as CX radiators are rare. Sometimes the cooling fan dislocates from its hub, or breaks a blade, and this will wreck the radiator.

> No exhaust blowing from the H-box or its 4 junctions (dead give-away is black stains over the chrome junction clips).

> If the engine seems to rattle for no reason, wrap a towel tightly round each H-box junction in turn. A leak here can make the engine sound tappy. Easy to fix and not at all worrying.

> No ***water leaks*** especially from the junction of the ***chrome transfer pipe to the water pump***, and at the ***transfer pipes to the cylinder heads***. Hoses should be good at top and bottom of radiator.

> Put the bike on its centre stand and from dead astern, grip the rear wheel. Try and ***twist the wheel*** and try to move it left and right between the two halves of the swinging arm. There should be ***no lateral movement***. If there is, the swinging arm bearings are shot and this is an MoT failure.

> To check for worn or damaged steering bearings, put the bike on its centre stand and push down on the rear, to lift the front wheel off the ground. The handlebars should go from full lock to full lock with only a light touch, and there should be no notched or stiff rotation. Now grip the fork legs by the very bottom and pull the forks firmly fore and aft; again there should be only a ***very slight 'bendy' movement*** and no clanking or rattling. Another potential MoT failure.

If you are not confident with the model, take a more knowledgeable friend along.

Paying cash and waving banknotes under the seller's nose is a very strong incentive.

If the bike is really, really what you want, pay the asking price before someone else comes along and snaps it up!

CX500 GL500 CX650 GL650

the *DISASTER ZONE*

Just When You Thought It Was Running Well ...

a gallery of *Things That Went Wrong*

1. CX650 Eurosport - (*John Zarecki* and *Ian Shearer*, Scotland)

This 650 Eurosport suddenly lost almost all engine power, and then appeared to free up. It soon afterwards developed a rumble from the rear of the engine, with a flickering oil light. These ominous symptoms almost always mean a failed big end or main crankshaft bearing. The owner managed to get home and shortly thereafter, the engine seized up. Not in a position to effect repairs, he sold the bike to a friend who dismantled the engine and sent me the following photographs of the carnage he found inside the crankcases.

You are looking down the cylinder bore, after the pistons had been removed. The steel shaft is part of the crankshaft, where the big-end joint of the connecting rod is bolted over the crankshaft journal, with the two semicircular shell bearings in between.

See that the journal is fatally scored after the big-ends have disastrously failed.

The two semicircular shell bearings which fit closely in between the big-end and the journal. Oil is pumped at high pressure through the lubrication holes and acts as both a lubricant and coolant, so that the big-end never actually touches the shells.

Here, the oil supply has failed for some reason - possibly cam chain wear which has sent aluminium shavings into the oil supply - and the shells have suffered fatal damage. Their faces are almost completely worn away, sending the dreaded copper flakes into the oil sump, which further contaminates the oil. Soon after that, the bearings get white hot and weld to the journal, causing the engine to seize.

This kind of damage is only repaired at very considerable cost and effort. It requires a new crankshaft and bearings, but the main problem is removing all the contamination from the oilways inside the engine. In most cases, a replacement engine is the only answer.

Apparently the 650 engine has an extra oil feed jet to the rear crankshaft journal, to improve oil feed and cooling, but the CX/GL engine, when seizing, nearly always suffers a rear bearing failure, as this one seems to run hotter than the front one.

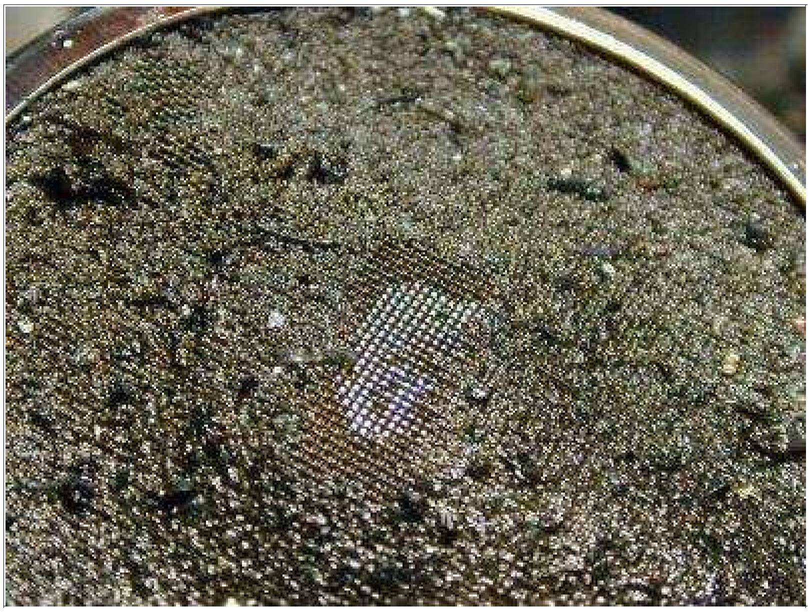
The much-dreaded tell-tale of both aluminium and copper flakes, in major quantities, at the bottom of the engine sump and crankcase covers.

Ah well, engine, it was nice knowing you ... this picture is the under-engine oil sump of the 650s and Turbos.

Similar picture showing

silver and copper flakes in the oil sump area. This is inside the lower right of the rear crankcase, just by the gear selector drum.

2. CX650 Oil strainer woes - *(Ian Shearer, Scotland)*



Ian noticed that his oil pressure warning light was flckering on tickover and that an oil flush showed specks of dirt in the oil. Suspecting the worst, he removed the front engine cover. Inside, he found that accumulated debris has almost completely blocked the oil strainer, fortunately without the engine having suffered any damage.

The photo (left) shows the upturned strainer, with its gauze almost completely blocked.

This could have been seriously nasty - Ian changed the oil pump and flushed the engine, and so far appears to have got away with it.

3. Cam chain carnage - *(Jon McComb)*

Jon reported major rattling from inside his engine and diagnosed a very loose cam chain, which did not prepare him for the carnage he found inside the rear casing.

Quite a substantial portion of the internal aluminium casting has been eaten away.

And here's more evidence - a thoroughly mangled cam chain tensioner and guide blade.

This is the end of the tensioner arm through which the locknut passes. It too has been chewed up by the slack chain thrashing about. And you still ignore that rattle inside your engine ... how can you sleep at night?

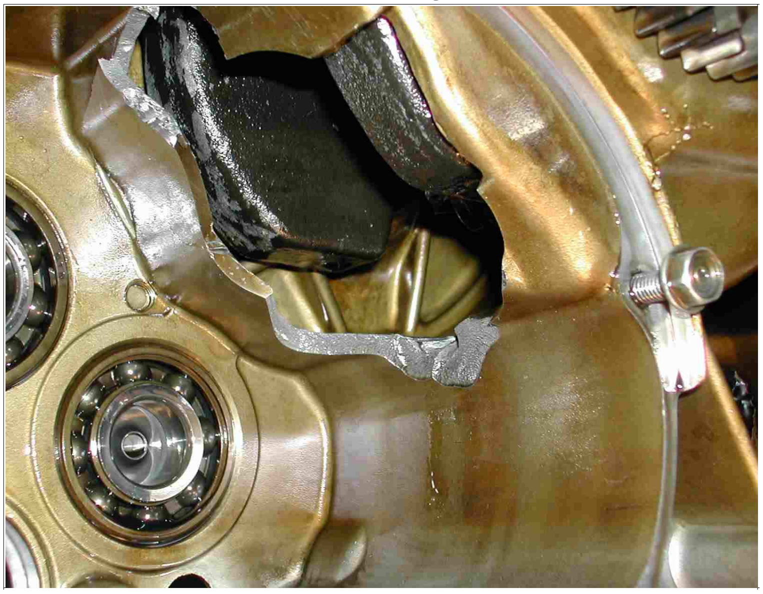
4. Broken connecting rod - *(Richard)*

This engine threw a connecting rod. This is a very unusual fault on the CX engine, and resulted in major internal damage.

Here you see the totally smashed piston, the remains of the connecting rod and journal, the mangled shell bearings and a pile of debris recovered from the bottom of the engine.

Severe damage to the (upturned) piston.

This is the lower engine space, with the gearbox removed to reveal the gearbox



bearings in the rear casing. A large portion of the internal webbing has been smashed away.

5. Oil Pump Fatally Damaged - Trev Hadley

Trev rebuilt his 500 Custom into a 650-engined version and thoroughly cleaned up the engine before modifying the C frame to accept it, and changing to transistorised ignition as well as making other necessary modifications. The engine ran very well and sounded superb, but we were worried when its oil warning light flickered when idling below 900 rpm and we decided to check out the oil pump. Trev had obtained a new low mileage 650 oil pump in the meanwhile, and we planned to install that.

On removing the radiator, front cover and sump bowl, we found that the oil strainer, despite having been thoroughly cleaned no more that 1,000 miles before, was almost completely blocked with what looked like animal hair. Since the engine had previously lived under a blanket which the owner's cat had used as a bed ... well, YOU explain how so much fur walked through solid metal and invaded the engine!

More tellingly we discovered that the oil pump was fatally damaged, with the inner and outer rotors deeply scored, although technically within tolerance. The pictures below show you what you DON'T want to find your oil pump like ...

(Left) the pump outer rotor, showing visibly deep scores along the perimeter. The flat faces were similarly marked.

(Right) the pump body has matching damage. It seems that the engine had been run (in a previous life) without the so-necessary spring and steel washer inside the oil filter housing, and which ensure that the filter is held tightly against the front crankase body. Failure to fit this essential part allows oil to bypass the filter.

Apart from this hitch, the 650 conversion went well.

6. CX650 Differential Failure - Steve Case

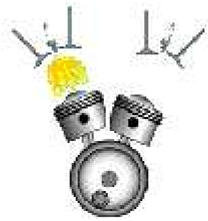
Steve says "This was a 650ED, 1986 29000 miles. It was used regualy for 600 miles per month commuting then - no tell tale signs or warnings - just the drive failed as I attempted to pull off at the lights. .There is a small crack across the teeth, this may have caused the failure or was a consequence of it - I'm not really sure."

This is a very unusual fault on the otherwise sturdy CX differential unit.

You are welcome to **comment** on this page, or submit additional pictures.

The Honda CX500 and Variants : Good and Bad

Buying Tips



Good things:-

1. ***Economical*** (50-60 mpg). The CX500 has a tank capacity of almost 4 (Imperial) gallons and gives a range of about 185 miles including reserve. 150-170 miles on the main tank is common. Ridden easily, you could just about wring 200 miles out a tankful. Note however that the Custom models have smaller tanks than this, whilst the Eurosports have slightly larger tanks.

2. ***Reliable*** - no major engine work for 30,000 or 40,000 miles.

3. Very ***comfortable*** to ride, especially for the passenger, as the pillion seat is particularly wide.

4. Easy to ***maintain*** yourself.

5. They ***don't overheat*** in summer traffic, and the cylinder heads do help to keep your knees warm in winter.

6. They are ***easy on tyres***, and the ***shaft drive is a dream***, with almost no maintenance at all.

7. There is a ***dedicated CX/GL Club*** following in most countries, with members invariably helping each other out with advice and spares.

8. ***Classic insurance***, although the exemption from road tax for 25 year-old vehicles was scrapped a few years ago.

9. You get ***plenty of attention from ex-CX***ers! It's common to ride round and see people prick up their ears at the distinctive sound of the engine. Many is the time I've seen car drivers, now married with teenagers in the back, look wistfully at my CX as I ride by. You can hear them thinking "Blimey, a CX500!"

Watch Out For:-

1. Early models (before 1981) had cam chain tensioner problems, which should have been sorted out with a free modification. CX500A models onwards are fine.

2. The alternator stators are prone to partially fail at extended mileage, especially on Turbos.

3. Rather top heavy, especially with a full tank - but you do get used to this.

4. The variants with just one single front brake and disc, are distinctly underbraked. These are mainly North American models, and imports.

5. Spares are just starting to get a little hard to track down. You can easily get consumables like filters and cables, but an elusive engine or frame part can be more difficult.

6. They do not like getting airborne, even a little, due to the torque effect from the inline crankshaft. I often thought that if you went seriously hump-back-bridge jumping, you could barrel roll a CX

back onto its wheels - but I've never dared try it.

7. Once the rear underside of the water pump housing starts to leak coolant, changing the mechanical seal is an involved task.

8. The underside of the swinging arm is prone to rot at extended mileage, or after neglect. This can sometimes be welded and plated, but a new replacement is in the region of £400. I have heard of some suppliers doing exchange swinging arm units for about £120.

9. The engine definitely needs crash guards (engine bars), as the cylinders poke out far enough to be seriously damaged in a spill.

10. They can be reluctant to start after a long layoff, especially winter hibernation.

11. The Eurosport monoshock units need annual strip and greasing, or they can stick, causing a poor ride and MoT test failure.

The Hannover Express

A Bike's Story

Thanks and Acknowledgments

February 13th, 2004

After a consortium of CX and GL owners here in the UK bought a massive job lot of spare parts from a breaker in Hannover, Germany (many thanks to Eckart Fahrenkamp), the treasure trove of parts was brought to England and divided up amongst the members of the consortium. Apart from the two "A" Model and two "Eurosport" frames, there was every conceivable CX or GL item you could possibly imagine. Every member of the consortium went off with enough parts to keep his or her bike going for the next twenty years. We reckoned that for the Ebay price of 376 Euros and about £400 in transport costs, we brought back between £2,500 and £3,000 worth of spares. Not that the items are so valuable in monetary terms, though; their value is in how useful they are now, and will be in the future.

My haul was one of the two "A" Model frames (with German registration document), swinging arm with differential, front and rear wheels, front forks and headstock, a-frame, radiator, wiring harness, airbox and battery holder, water bottle and many smaller and useful parts. Add to this the parts already in my spares boxes (tank, plastics, clocks, switchgear) and you will see that I have almost everything I need to build a CX500A from scratch. Exactly as I want it, and all looking good.

This will not happen overnight ... but this page will document the process, which will take a long while, because there is a lot to do. My target is to have the bike on the road by early summer 2005, which would be on or about its 25th birthday.

Looking at the German log book and from what I can make out, the previous owner was Norbert Erich Ahrend of Ronnenburg, from whom I'd be delighted to hear. The frame appears to have come from a CX that was broken up in February 1994. So, ten years later, it's mine. I found out in August 2004 that the German frame was originally belonging to a 'restricted' CX500 model, presumably a reduced-BHP model designed for those who had recently passed their motorcycle tests.

I've tried unsuccessfully to contact Herr Ahrend so if anyone knows of him, please tell me.

February 19th, 2004 : degrease and test assemble

Today I collected all the Hannover parts and degreased everything. The frame cleaned up very well indeed and is in excellent condition, although it will still need powder coating. The swinging arm, front forks,

driver and passenger footrests, radiator and cowl, water bottle, front and rear wheels, airbox, A-frame, toolbox, rear brake hub, actuating rod and centre stand all went on "to see how they fitted" and in order to take the photos.

The rear mudguard is from my spares collection, from which I'll be adding plastics, tank, CDI, coils, regulator / rectifier, instruments, propstand, front discs and switchgear.

As yet I haven't been able to register the frame in the UK, but from correspondence with the DVLA, I'll have to first get the bike in for an MoT test and then apply for a UK registration. At that point they should give me an age-related plate.

March 27th, 2004

I've just obtained an airbox holding bracket from Ebay, and now have enough parts to have the frame, engine hanger, swinging arm, airbox bracket, radiator cowl, engine mounting plates, front fork top yokes, centre and propstand shot blasted in preparation for etch priming and powder coating.

April 13th, 2004 : After shotblasting

Today the various metals came back from the shotblaster, who made a very good job of them and was particularly interested in the project.

The headstock has the frame number CX500-3002914, which makes the frame officially a restricted-bhp model.

Now all the main parts are all ready to go off to the powder coating works.

MCRP (Midland Coating Removal

Process) Unit 38, Hadley Park Industrial Estate, Hadley, Telford TF1 6PY (01952 240849) did all the shotblasting for me and I recommend their services.

Monday April 19th, 2004 : after powder coating

This morning the metals came back from the powder coating works. I was stunned with the quality of the work and the overall finished effect, all the parts looking like they'd just come off the production line.

All I can say is, if you're restoring a bike, if you don't have the metals cleaned up and coated like mine, you'll kick yourself for the rest of your life. See the pictures and judge for yourself.

The swinging arm looks as if it's brand new, without a blemish or any whisker of rust pitting.

Who did this brilliant job?

KYOPS MANUFACTURING, Unit A8, Halesfield 9, Telford TF7 4QW. 01952 583988.

April 25th, 2004 : assembly

Today the rebuild started in earnest. The swinging arm, centre stand, airbox bracket and airbox, battery holder, regulator/rectifier equipment, rear mudguard and CDI were fitted, in brilliant sunshine, which has made the frame look a lot more blue than it actually is.

The bike looks like a dog sniffing the air!

Rear shocks are clapped-out units and just fitted temporarily to allow the

chassis to be mobile.

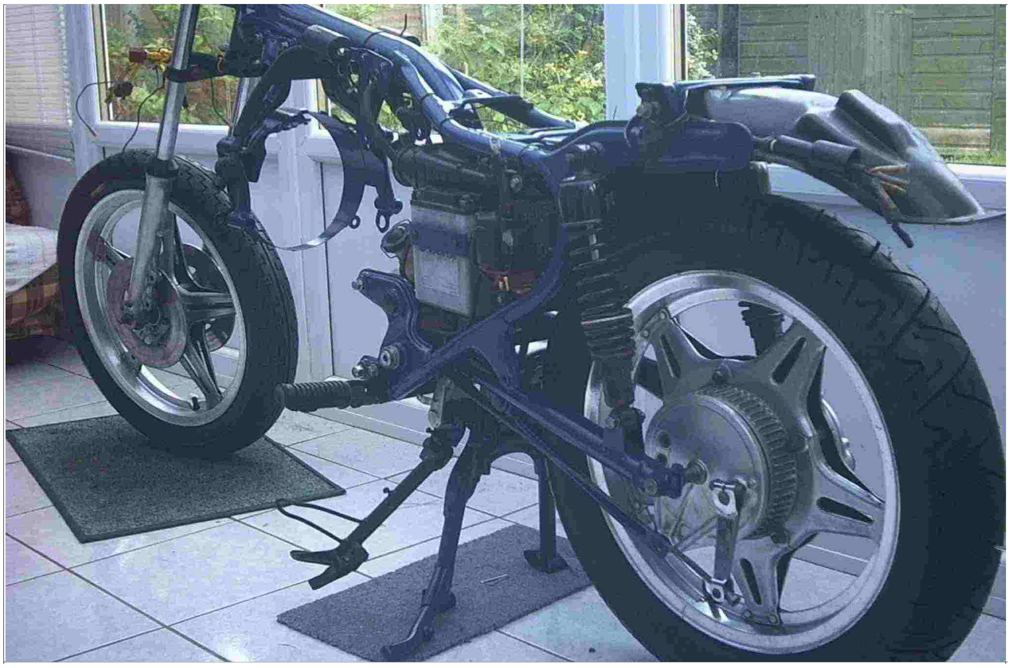
Both wheels cleaned up really well and I don't think I'll have to spray the spokes with anything to touch them up. What I took to be surface rust spots were just dirty patches, and these came off with some kitchen cleaner and energetic use of a scouring pad.

Some light pressure with a wire brush removed what tiny flecks of rust remained.

Reassembled mid and rear frame back in the conservatory after a day's work.

May 8th, 2004 : tyres and electrickery

Yesterday the wheels



came back from Wylie & Holland with new Continental Tours fitted, and the radiator front shroud arrived from the Ebay purchase. I spent a couple of evenings last week polishing up the front fork legs, a job I hate, but one that's worth while in the end; I even found that the fork seals looked new so I left them in..

So today it was fitting the wheels and hauling the growing mass back onto its centre stand, fitting the propstand and then trying to realign the centre stand spindle so I could insert the split pin. Then it was a case of scrubbing the rust and corrosion off the radiator shroud and spraying with half a dozen coats of silver polymer wheel paint.

Looking much better with wheels and boots on.

I used some hollow plastic trunking to tidy up the electrical wiring; just cut it to the correct length, slit it longways, tuck in the wiring harness and then use tie-wraps to hold everything in place. This looks neat and keeps things better protected.

May 30th, 2004 : before the respray

With refurbished brake caliper mounts, new rear shock absorbers and front mudguard, and the old tank and plastics temporarily attached, the Express is shown below "before the respray". Although I intend to use an electronic paintbox to try different paint schemes, I have more or less settled on straight silver for the paintwork.

The tank and plastics came from a Z model that was scrapped about two years ago in the Portsmouth area. The tank filler cap flap had a checquered-flag sticker on it and one of the side panels had an EBC brake pads sticker. I removed both of these before the respray but I wonder if the previous (name unknown) owner recognises the description? The tank's red paint was quite faded on the top surface.

Tired and faded paintwork quite obvious here. This is the photo I'll be using to try different paint schemes.

July 6th, 2004 : After the respray

Today the tank and plastics came back from the sprayshop and I was extremely pleased with the result. Steve Lawley of Court Autos did the work and made a first class job of it, colour matching the blue to get the tank stripe and filler flap right and spraying the rest in a deep metallic silver.

Anyway judge for yourselves - but remember - the photos don't do it justice!

New steel brake lines, refurbished and resprayed brake calipers and the wonderful paint job are all adding up to something really special!

I now have all the parts I need to complete the build (rear and front lights, indicators, instruments, saddle,

silencers, H-box, downpipes), and as soon as my garage is cleared of the latest influx of spare parts, I'll finish the job. The bike has now been Datatagged.

September 21st, 2004 : After the engine was rebuilt

After again scrabbling round for some silly bits missing, like the pair of screws which hold on the ignition timing ring, the timing cover plate itself and the 4 capscrews which hold on the chrome pipe arches - thanks to the friends to sent me these parts - the engine is finished. This was a 500cc Eurosport engine but with the rear casing, new stator and pickups from an 'A' model so that I can use the CDI and existing electrics.

This engine has the automatic camchain tensioner, and I had to slightly enlarge the hole in the rear casing where the manual locknut would normally have passed through, because the securing bolt for the auto unit doesn't quite line up with the hole. The remaining hole was sealed with plastic metal from the outside, as there wasn't room for anything else.

The engine is here seen on its transport dolly, waiting for a gearbox oil seal which I've just ordered. The saddle is away being recovered, and the rocker box covers, water pipe and other bits are away being powder coated.

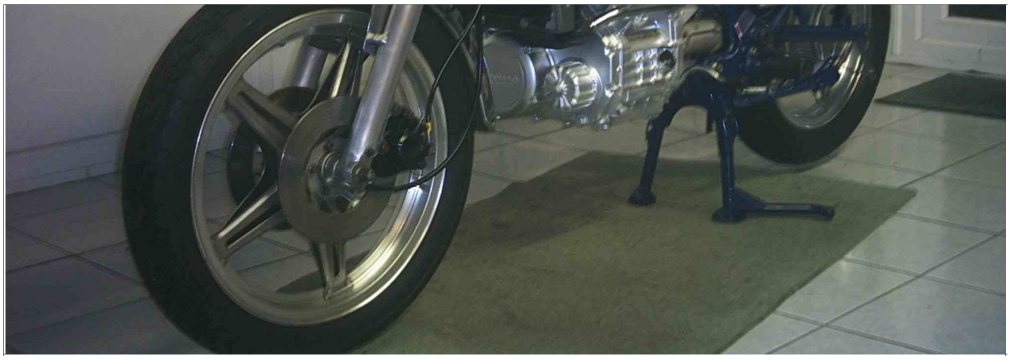
After some struggling with the spaghetti inside the headlamp cowl, I've finally sorted the wiring, and everything now works (despite having two or three wires left over ...)

Hands up if you didn't realise that the flasher unit can't be wired the wrong way ... don't ask me how I know!

October 2nd, 2004 : Engine installed

After spraying the engine block with Halford's silver heatproof engine paint, Trev Hadley and I fitted the engine block and radiator.

Taken at the end of a long afternoon, here is the Express with its



engine in place and connected up. Still to come are the carburettors, which are currently being cleaned, and the exhaust system - I have a pair of new silencers ready to go on.

For the purposes of the photo-shoot, I've borrowed Valiant's saddle and sitting on the almost-complete bike was a view I've waited eight months for!

Next step is to start the engine. It turns over OK and pumps oil to the top rockers, and the oil light goes out, so it's all a good sign.

"Silver Dream Machine" !

THE HANNOVER EXPRESS COMES TO LIFE

I am delighted to report that the Hannover Express's engine came to life at 21:50 on Wednesday October 6th 2004. It did the usual CX trick of showing signs of life on the left hand cylinder, did a few goes like that and then was left for 10 minutes. On the first press after that, the engine sprang into immediate life on both cylinders, and although it sounded very loud in the conservatory, having only the downpipes fitted, it did sound absolutely normal.

This has been a great moment of triumph for the bike, as the frame languished in store for 10 years, only to be dragged to another country and then have all sorts of other CX parts bolted to it. However, come the weekend, I will be wheeling it outside and doing a longer engine test, with the H-box and silencers fitted so as not to annoy the neighbours too much.

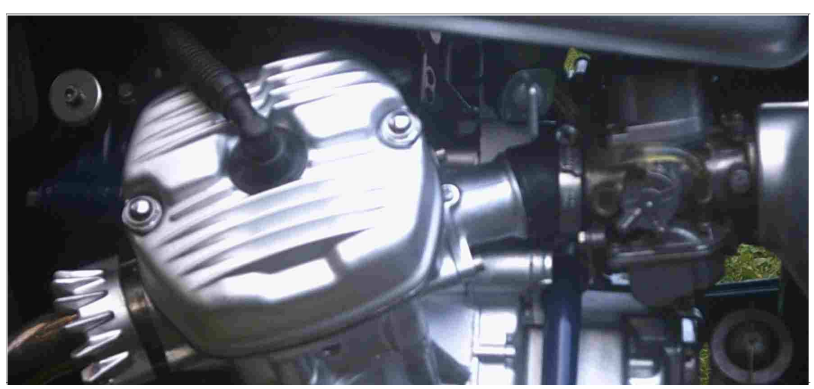
October 24th 2004 : final assembly and test ride

The engine has now had several static runs up to full temperature, and I've trundled the bike up and down the driveway to check the gears.

Here is the bike with new silencers fitted and looking about ready for the road.

The number plate is, I'm afraid, fanciful! I don't know what it will end up with.

I've had the water transfer pipe, plus the short water pipes and junctions which carry coolant from the thermostat to the cylinder heads, powder coated to match the frame.



November 29th 2004

Everything seems OK except that one of the exhaust flange studs broke off the left cylinder head, and as there was not enough metal left to effect a helicoil repair, I've fitted a replacement head, very kindly donated by riding chum Trev Hadley, whose delightful pink CX500 "Miss Piggy" rebuild saw the road in January 2005.

The front brakes are now working after receipt of a brake master cylinder. The rear carrier and footrest brackets are away being shotblasted and powdercoated.

December 31st 2004 : rollout

On New Years' Eve afternoon. I fitted the rear indicators to the powdercoated rack, and retrieved the bike from the conservatory to give it another engine run up and down the driveway. Everything worked fine except that one of the indicator relay bulbs failed on the dashboard due to wiring fault in the headlight shell - now fixed.

A double copper crush gasket sealed the right hand downpipe to the head, so the blowing I had on the last engine run has gone, and the motor sounds sweet.

Finally, I've sealed the drain plugs in the front fork legs and filled the legs with fork oil. Then to get my saddle back after being recovered - and then the bike should go through an MoT test and I can see about getting it UK plated ready for

Spring 2005.

Until then I'll have to stick with this fanciful number plate.

February 13th 2005 : teething trouble

A longer engine run revealed that oil was weeping from somewhere behind the timing adjustment plate on the rearmost part of the engine. I tried sealing this from the outside with silicone sealant, but due to the extremely restricted access, I couldn't stop the leak. However Trev Hadley gave me a most welcome hand in dropping the engine today and we helicoiled all 5 bolt holes and replaced the gasket. So far so good - no leaks - thanks again Trev!

This date is exactly ***ONE YEAR*** after the first diary entry at the top of this page.

The MoT is all that remains, and once I get some dry days, I'll get this done and see about a proper number plate. I was recently officially informed by the DVLA that provided the vehicle is insured for road use, you can drive it to and from a pre-booked MoT test, on the chassis number alone.

A very fortunate Ebay purchase turned up an almost-new saddle from a seller in the Bicester area, and a windscreen from the UK Owners Club Shop, plus a new zero-miles speedometer from David Silvers, completed the build. It seemed daft to have a speedo with 29,000-odd miles showing when the bike is, to all intents and purposes, new.

March 5th 2005 : MoT test, *and the paperchase begins*

The Express today went up for its MoT *(UK roadworthiness test)* and passed without any problems. The inspector said "We've never had a CX as nice as this." When I arrived back home, the temperature gauge wasn't working ... this was just a disconnected wire in the headlight shell. But I did show the bike to the chap who did the shot blasting for me, and he was very pleased to see it.

I've now filled in "Form V55/5:Application for a first licence for a used motor vehicle, and declaration for registration". I'll present this at my local DVLA office, with the German registration document, and we'll see what happens.

March 19th 2005 : all done!

With only one minor glitch to the paperwork - a self-declaration VAT form for a vehicle imported from the EU - the paperwork was completed quite painlessly. The registration fee was £38 and the year's road tax was another £45. A day or so afterwards I had a letter asking me to bring the bike in for a DVLA inspection,

and they said it couldn't be ridden so I had to trailer it. However, the inspection proved to be a 10 minute check that the chassis and engine numbers were OK A couple of days later I received the authorisation to get the number plate made. The staff at DVLA office in Shrewsbury were helpful and friendly. The V5 document arrived two days later, but had an error on my name so I sent that back for correction. The documentation was all extremely painless, and much easier than I had anticipated.

Here is the Hannover Express on its maiden voyage.

They gave me ***DUJ63T***, an age-related (1979) plate, with UJ corresponding to Shropshire. By coincidence, UJ also corresponds to the wartime aircraft codes for No 27 OTU (Operational Training Unit) at RAF Lichfield / Fradley, in which I have an interest.

The only snags which came up on the 50-mile test run were a noisy tappet and some exhaust smoke, so I'll check the tappets and do an oil / filter change soon. We think the engine has been re-ringed so I am not too worried about the exhaust smoke at the moment. I'll also balance the carbs properly.

This was a very exciting day for me, and the end of a 14-month saga which has cost me just over £1,600 plus a huge amount of time and effort. I've received unstinting help from fellow owners, who are all very bashful about the assistance they have rendered but who all know who they are, and how much I value their support.

One very happy owner! You can just see the small black PMR radio, between my helmet and gloves. Many of us are now using these for bike-to-bike communications. The most popular model is a Cobra MT525, with a proper helmet headset and remote press-to-talk button.

July 2005 update

The CDI-modified 500cc Eurosport engine, after a couple of hundred miles, started making some very unwelcome noises, so rather than risk the engine blowing up miles from home, I removed and scrapped it for spares, transferring the cam chain, adjusters, stator and mechanical seal to an engine very kindly given to me by Richard Todd. I gave the Eurosport engine centre section to another club member, who stripped it and found that the shell bearings were 0.75mm oversize and completely wrecked.

This new engine was a completely unknown unit but has proved to be reliable, and after attending the Welsh Rally and covering 300 miles, I've just removed it for spraying. I used Plasticote Hot Paint from Halford's and used rather less than a canful to give the engine two good coats.

It has also had a replacement pair of refurbished cylinder heads, and goes very well - even though I have no idea what the mileage is on it. The carbs needed a strip and clean as the bike was only doing 38 mpg, and as it's only returning 44 mpg afterwards, I am still tinkering with the carburation.

It's good to have the engine looking smart again - the

casings were a bit tatty and stained, and it detracted from the general appearance of the bike.

As at the end of August 2005, the bike has covered just over 1,000 miles and apart from the engine change, the only problem I've encountered was a lost bolt which had vibrated off.

You are welcome to email me.

I would like to state that I could NEVER have come this far without the loyal support of my comrades in the UK Owners Club, who gave me a great deal of physical help and encouragement, plus gifts and loans of many spare parts.

Thanks and Acknowledgments

Are you undertaking (or thinking of) a similar project yourself? See what I did ***Right and Wrong*** *on the 'Hannover Express' work.*

The Honda CX500 and Variants

Good and Bad Points : Buying Tips

Some folks call them the ugliest bike ever made, and say the "Plastic Maggot" was awful.

These people have never understood the CX500 and have probably never ridden one. Any modern motorcyclist used to plastic-fantastic street racers won't give a CX a second glance. But I say that my CX500 will still be turning heads when the last of today's plastic-fantastics has gone to the scrapyard after 20,000 miles of throttle-bending. My main CX has done 55,000 miles, is 24 years old and still has another 20 years and 45,000 miles left in it. I can give modern 500s a run for their money, and anyway I'll sail past them when they stop for fuel / tighten and lube their chains / cool down. It will probably see me past the age where I can ride it.

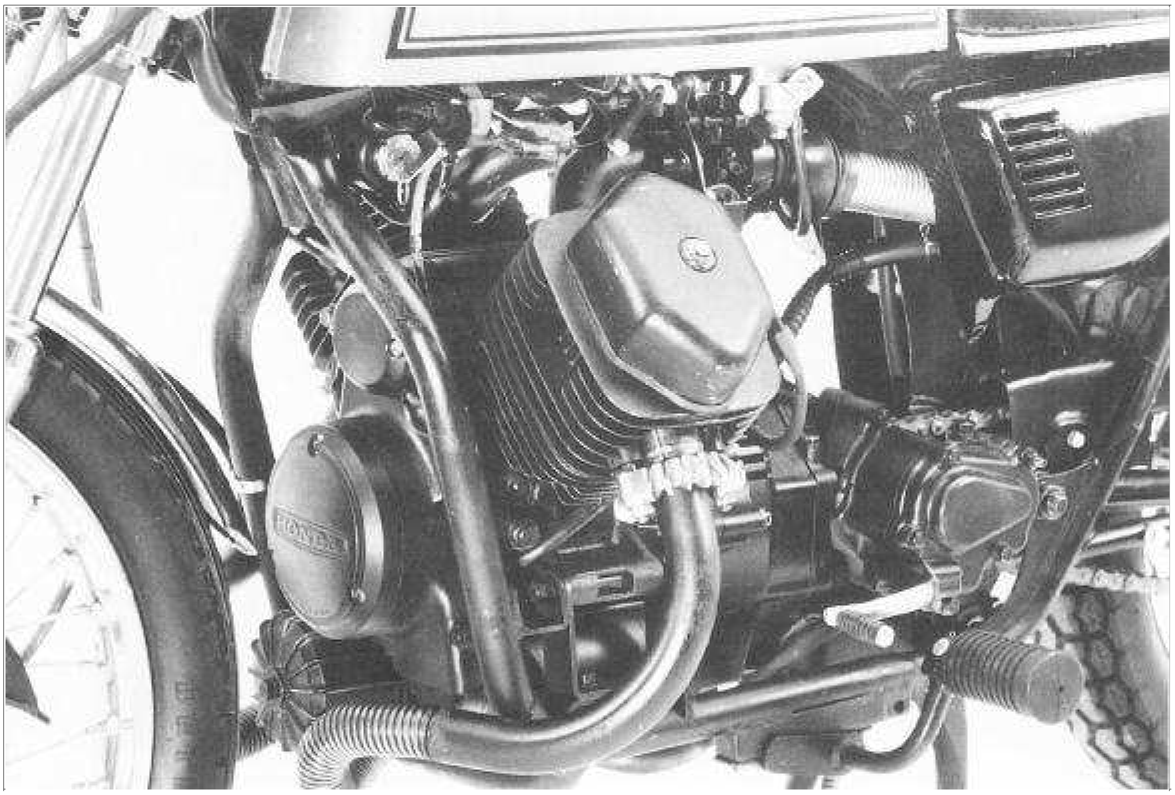
The second CX500 - the rebuilt 'Hannover Express' has its own page.

CX - Charisma eXtrordinaire

PROTOTYPES

Honda developed the CX500 from two prototype models. Here the CX350 is shown in development form, with the engine married into a modified CB200 frame.

There is not much of the CX500 to see here, and the long exhaust pipes suggest some trouble in Honda's attempts to get the exhaust system right!



However, the engine does demonstrate one or two of the characteristics of its eventual grandson.

Nobody seems to know if the CX360 (right) was a

production model or an advanced prototype.

Here you can see a lot more of the family line; water cooling, engine shape, styling and early Comstar type wheels.

Honda haven't yet effected the twisted cylinder heads of the true CX500.

When the "real" CX500 arrived in the UK in June 1978 as an in-line-crankshaft short-stroke V-Twin cylinder, 5 speed, shaft drive, watercooled touring machine with a capacity of 496cc developing 50 brake horsepower, it was a revelation.

Concerned about carburettors and riders' knees colliding, Honda had now twisted the cylinder heads inwards by 22 degrees, giving the engine a very distinctive inlet-exhaust line. The 80-degree firing angle gives the CX that characteristic engine purr, so beloved of V-twin engine fans.

Unusually for Honda engines of the day, it had an overhead valve (OHV, or ushrod-operated) 4-valve-per-cylinder engine. It proved very easy to ride, economical, reliable and unburstable, quickly acquiring a very large following, particularly in the despatch rider market. With the engine placed at the bike's exact centre of gravity, it was surprisingly agile for its size.

The Moto-Guzzi V50 (right) was the CX's only class rival. It too was an in-line-crankshaft V-twin, 500cc shaft drive. Its aircooled engine was more bulbous, and although its Italian styling was more aesthetic than the CX, its performance was inferior, as was its longevity and general build quality.

The CX500 generally replaced the CB500/4 and CB550/4, the very British-styled CB500T, and arguably the CB400 Superdream, although the ubiquitous Superdream in both 250cc and 400cc variants continued to be produced after the CX arrived. It therefore gave many riders the experience of a "real bike" after passing their UK L-Tests (later, the Part 2 Test), on a 125cc.

Not only is it easy to ride; stable and forgiving, but It was, and is, easy to maintain even for the home mechanic, everything being made simple by the engine layout. With the cylinder heads projecting towards the rider's knees making tappet checks and adjustments is particularly easy, and a decoke is far less hassle than a conventional engine. Honda made the gearboxspin in the opposite direction to the crankshaft, to cancel out most of the torque effect inherent with inline crankshaft V-twin engines. Its barrels, however, are integrated into the engine, being cast into the engine centre section and not detachable.

The early model (shown at the top of the page) was known as either the CX500 or CX500Z (Zero) , and models with the frame numbers in the range 2000001-2034366 suffered a shortcoming in the design of the cam chain tensioner. The spring loaded adjusting blade, released manually by a locknut to take up slack and wear in the cam chain, vibrated excessively and in many cases, broke. This left the rider with, at best, a noisy engine and at worst, a wrecked one. This sad deficiency marred the early days of the CX500 but Honda quickly produced a free fix, consisting of a longer supporting plate and a few modifications to the internal mountings. This did involve removing the engine, but dealers carried out this work for free and nowadays seeing one of the old adjusting mechanisms is very rare indeed.

Having said that, some CX500Zs do still crop up with unmodified parts. Dealers stamped three dots (left) in the crankcase, close to the engine serial number, to indicate that these modifications had been carried out. Any surviving engine of this vintage is unlikely to be still unmodified.

(Thanks to John for the clear photo.)

Once the early cam chain problems were resolved, the CX500 rapidly became the despatch rider's dream bike. You could seriously neglect it, crash it, leave it out in the foulest weather, run it up and down the motorway all day at 80 and it would never let you down. In the 1980s every other motorcycle in London was a DR and every other DR was on a CX500. The bike quickly acquired a reputation as one of Honda's most successful and reliable models. This explains why so many CXs still survive, compared to the almost equally successful 250 and 400 Superdreams. In the UK today it's rare to see a Superdream about (or even more rare to see a 250 or 400 Dream), but CXs pop out of from under the covers quite regularly, especially as the model gradually acquires cult status.

In 1980 the CX500A was released. Changes to it were mainly cosmetic, such as the polished aluminium radiator shrouds rather than the black plastic one-piece surround of the CX500Z model.

But it was essentially the same, now fitted with the modified cam chain adjusting components as standard. The B model (right) followed a year later with more cosmetic changes. Thanks to Gooner for permission to use this lovely bike for the photo.

The A/Bs have the polished aluminium radiator shrouds, a flyscreen, lack the black plastic tabs over the spoke/wheel attachments, and have a rectangular instead of barrel-shaped front brake master cylinder. The B has black anodised reversed-plate Comstar wheels, whereas the A has plain silver ones. Also the B has the improved crankcase breather pipe, which comes from the rear engine casing instead of from the cylinder head, and the B has a slightly differently shaped rectangular brake cylinder to the A.

Note that the North American variants usually have a single front disc brake, and as a result, they are distinctly underbraked.

The C "Custom" versions (left) satisfies the more laid-back riders.

The Silver Wing (GL500, right) is a fully-faired hard-luggage tourer.

There was also a "D" Deluxe variant (left). Thanks to Ariel Pablo Kulas of Buenos Aires for the photo.

The CX500 is ever a practical

motorcycle. It's shaft drive requires virtually no maintenance, and makes rear wheel removal a five minute, and hands-clean, job. A massive radiator (left) solves summer overheating problems and keeps the engine at the optimum temperature, for both economy and longevity.

Undeniably a heavy, and with a full fuel load, particularly top-heavy design, it turns in a surprisingly agile performance for an elderly V-Twin, 500cc pushrod engine. It will cruise comfortably at anything between 50 and 80, and whilst clearing the ton means a long straight road and the ghost of a tailwind, it will top 105 mph in a dive.

Some riders have reported 115 mph, but this must be a doubtful claim on the straight and level.

Its clutch is feather-light, but its chief characteristic is an astonishing amount of torque at low revs, reminiscent of a modern diesel engine. It will trundle along happily at well under 30 mph in 5th gear and still pull away cleanly from that speed. Geared to 12 mph / 1,000 revs and redlined at 9,650, the motor always seems unburstable. Hard indeed is the rider who cannot achieve 50 mpg (Imperial gallons, 8 pints/gallon) and many return 55-60 mpg even at 20-25 years old.

In 1983 the Eurosport model (right) had a major facelift with monoshock rear suspension, transistorised electronc ignition, new style wheels, and air forks. The standard set of two x single piston caliper front, and rear drum, brake gave way to 2 x twin piston calipers at the front and single at the rear, vacuum fuel tap and fuel gauge. This model had an automatic cam chain tensioner, too.

(Thanks to Gaz for the photo. He says he has now removed the ugly rear carrier, and fitted a more aesthetic one!)

Evidently pleased with their success, Honda upped the capacity, and the CX650 (left) was born. *(Thanks to Pete MJ for the photo.)* Never made in the same numbers, the 650 is an outstandingly good motorcycle, now much sought after by CX fans. Its 673cc capacity overcomes its weight and it's altogether the bike that the 500 should have been.

GL650 (right) came in various guises of different styling, with deluxe hard luggage and so on. These were particularly popular in the North American market, and are excellent touring machines.

I can't for the life of me understand why Honda didn't produce this model in 750 or 850 versions, although various other countries had different variants - France's CX400 and Australia's GL700 to name only two. My email correspondence shows that a GL400 recently cropped up in Argentina, and a CX400 in the Netherlands.

Kathy Leslie in Australia says of the GL700 : "*The GL700 Wing Interstate model was a production run of about 800 bikes that were made exclusively for the Japanese domestic market during 1983/4. They were meant to satisfy the desire of Japanese motorcyclists to own the GL1100 and GL1200 Goldwings (they weren't allowed to due to a 750cc restriction which has subsequently been removed); and the motor in the GL700 is the same 673cc motor used in all the CX650 models - I guess that in the 'more is better' stakes, 700 is obviously much closer to the 750 limit than 650!!*"

Both the CX500 and CX650 also had Turbo models (CX650T, left) - these are very rare indeed. I rode the CX650T round Donington once, and it was easily the best bike I've even been on. Only about 1,700 CX650Ts were made.

Anyone lucky enough to have the chance to ride a 500 or 650 Turbo will wonder where Honda managed to hide the extra engine that seems to be lurking inside the plumbing! The power delivery is very progressive, with a very distinct between-the-ankles rumble as the Turbo starts its business, at which point the extra engine wakes up.

The Black Bear - my CX500 Turbo

In May 2005 I was extremely lucky to be able lto buy a CX500 Turbo from a seller in Lincolnshire who was emigrating. Thie bike has been resprayed black metalflake.

After fetching it from its former home I then took it on the 2005 UK National Rally and in 10 days I had done 1,000 miles, followed later that year by a 1,700 mile tour of Scotland.

Once the synthetic oil had been swapped for mineral, the clutch slipping was cured, and the sticking waste gate was fixed by changing the turbocharger unit in January 2006.

This bike is really fun to ride and astonishingly rapid after the normally aspirated CX.

Today the CX500, CX650 and the touring GL models are owned by people more as collector's items than everyday hacks. As time goes by, we hear of CXs being re-discovered in barns, sheds and under tarpaulins in a back garden, having a battery connected and still coming to life (after some persuasion).

These models are now acquiring classic status, and many are being restored to showroom condition. I believe that the model will become as famous as the Triumph Bonneville or the Norton Commando.

The most reliable part of the bike is undoubtedly its engine. Properly serviced with oil and filter changes done on time, the engines just don't go wrong. It's common to look inside a CX motor after 40,000 miles and find no abnormal wear at all. True, the cam chain and tensioner will need replacing, and a good mechanic would change the mechanical water pump seal at the same time, but that's par for the course at that mileage. The cooling system and electrics are also reliable, with a couple of cautions which are identified on the **Good & Bad Points** page.

Engine (left) removed as a complete unit, with radiator, engine hanger and carburettors.

A CX500, CX500A or CX500B, Eurosport, or a GL variant, will fetch anything between £100 for a basket case (the parts alone are worth more than this) and £800, even £1,000 for one in really top class condition, especially if it can be proven that maintenance has been correctly done. Typical **Ebay** price for one in average condition would be

£350-£600.

I find that both the CX500s I've owned (FET800V and LUD297W) fitted me like a glove, like a second skin, but that's just me and my riding style. I find it quite manoeuvrable enough and with some practice you can do stall turns (a stall turn is used when filtering though lanes of stationary traffic; without touching down your feet, come to a stop between two lanes, turn 90 degrees left or right, pass between two vehicles, turn 90 degrees again and carry on filtering. Done slickly, it's a very pretty thing to watch).

On fast bends some countersteer is advisable. You don't need fistfuls of countersteer, just a subtle pull. (Countersteer is used on heavy bikes to assist cornering, and you apply backwards pressure on the handlebar on the outside of the turn. Be ***careful*** when you try this - it really is a subtle technique.)

The worst technical failure I have had with a CX500 was a blown main fuse. I've done preventative maintenance like mechanical seals, but I've never had a CX blow up or suffer a major failure. Those who have suffered engine failure can usually trace this back to neglect on the part of a previous owner - usually the failure to change the cam chain apparatus at the correct intervals.

The model is now old enough for some owners to have effected changes to the design. Andrew Parry's CX (left) shows a solo seat, custom-made side panels and other cosmetic changes to a "B" engine with "A" wheels.

He says that "The bike had been rebuilt,on a Q reg, it has a new frame, different front fairing, single seat, bullet indicators, different mudguards and home made side panels. It does look different from the original, but the mechanics are CX through and through."

This is a GL250 - the right hand piston, connecting rod and cylinder head have been removed and a blanking plate fitted. Thanks to Dick (in Raleigh) for permission to use the photo. He says "*The bike pictured is a GL250 Single. The engine is running in*

the picture. The frame is my (original owner) 1981 GL500I with 6,300 miles. The correct engine is out of the frame for a water pump rebuild. Used the frame to test my single cylinder engine. It actually runs decent. Not fast but I guarantee you won't complain about the gearing being too low. The engine is made up from bad and excess parts that were laying around.

"I had to re-balance the crank. The big end of the rod is there to take up space and block the oil passage. The crank came from an engine that spun its right rod bearing. The block has a nice groove in the right bore. Took a chance on an untested stator and it is good. Exhaust will be stock components but haven't decided to use 1/2 of a collector or a piece of pipe. Have to block off 1 passage to the air box hose."

Gasp !!

Here is the best snap so far of my rebuilt 'Hannover Express' which arrived from Hannover, Germany in the UK in January 2004 as a pile of bits in the back of a van.

It was completely rebuilt from scratch, with the metals shot blasted and powder coated, the tank and plastics professionally resprayed, and every part either replaced or cleaned and renovated.

This photo was taken on New Year's Eve 2004.

The CX was replaced by the VT500, which despite being very different, somehow managed to inherit a little of the CX's charisma. It's engine and brakes were a pain to work on, though, and it has an annoying clutch clatter at low revs.

Here's what you can do without removing the engine:-

Oil & Filter change / clutch removal / valve clearances (tappets) / manual cam chain adjustment / water pump removal / cylinder head decoke / Radiator removal / fan removal / oil pump removal

You must remove the engine to do these jobs:-

Mechanical water pump seal replacement / cam chain and tensioners change / crankshaft & piston removal / gearbox removal / rebore / stator change / camshaft removal.

The CX500 does not have detachable cylinder barrels; these are integral with and cast into the centre engine section. Unlike most motorcycle engines, reboring a CX is a major operation. However rebores are rarely done and mileages of 100,000 are normal on the original bores.

Which Model CX / GL Do You Have?

Remember that with bikes this old, there has probably been some interchanging of parts between models. For example, a CX500Z fitted with a Eurosport engine and B model wheels, yet lacking the flyscreen and polished aluminium radiator shrouds. However the *frame number* dictates the original model.

Most North American models have only one front disc brake, whereas European variants have twin front discs.

Model	Frame Numbers	Distinguished By
Original **CX500** (Z, or zero)	CX500 - 2003736 to CX500 - 2051719 **1978** : CX500 - 2000001 onwards **1979** : CX500 - 2100006 onwards My June 1979 German CX500 has a CX500 - 300xxxx number - technically a Z but I've rebuilt it as an A.	Barrel shaped front brake master cylinder; black tabs where the Comstar wheel spokes join the wheel rims; black plastic one piece radiator shroud; no flyscreen; rear drum brake. Steering lock on the left side of the headstock. Engine breather pipes from cylinder heads to T-pipe junction thence to airbox (the "B" model bottle conversion is often done to these engines). Early **cam chain failure** on frame numbers 2000001-2034366 Paint is not metallic; CDI ignition UK registrations are **S, T** and V. All 500s (except Turbo) have mechanicallly-drived fans bolted to the nose of the camshaft. All 500cc (except Turbo) cylinder heads are interchangeable. ZAB fuel tanks are interchangeable and these also fit the C with minor modifications.
CX500A	**1980 :** CX500 - 2200013 onwards	As "Z" but with rectangular shaped front brake master cylinder; polished aluminium alloy two piece (left and right) radiator shrouds; flyscreen; metallic paint; CDI Ignition, steering lock on the left side of the headstock. UK registrations are **V** and W.
CX500B	**1981 :** CX500 - 2300004 onwards	As "A" but with reversed black anodised Comstar wheel spokes. Steering lock built into the ignition lock. Bottle conversion to engine breather pipes, with direct pipe to airbox and cylinder head breather stubs blanked off during casting.

		UK registrations are **W,** X and Y.
CX500C	**1979** : PC01 - 2000017 onwards **1980** : PC01 - 2100018 to PC01 - 2125022 **1981** : PC010 - BM200006 to BM212752 **1982** : PC010 - CM300001 to CM307389	Custom variant High handlebars Teardrop shaped tank CDI ignition, manual cam chain tensioner. Rear drum brake
CX500C-B	PC01 - 2200006 onwards	The only UK custom variant. Steering lock on the left side of the headstock. UK registrations are **W**, X and Y.
CX500D	**1979** : PC01 - 40000006 onwards **1980** : PC01 - 41000002 to 4107865 **1981** : PC011 - BM200011 to BM205030	Deluxe custom
CX500E-C	PC06 - 2000029 onwards	"Eurosport" UK and European variant. Black anodised portions of the engine casing; monoshock; air forks. Automatic cam chain tensioner. Twin piston, twin caliper front brake and single twin piston caliper rear brake. Plastic or glass fibre front mudguard. Fuel gauge. Steering lock integral to the ignition lock on this and all subsequent models. UK registrations are **Y**, A and B.
GL500	**1981** : PC020 - BM00022 to BM007550 **1982** : PC020 - CM100001 onwards	Silver Wing. Hard-luggage fully faired tourer; electronic ignition but manual cam chain tensioner.
GL500I	**1981** : PC021 - BM000007 to BM004396 **1982** : PC021 - CM100001 onwards	Silver Wing *Interstate*
GL500D-C	not available	UK touring variant

CX500TC **"Turbo"**	1982-84 Sample frame number P00-32001081 Sample engine number P00-32001001	Faired turbocharged variant of CX500 Eurosport. 5,343 built, with 5,257 shipped, of which 200 came to the UK. Imports have headlights permanently on; UK models can turn them off. 82 bhp. UK registrations A, **B**, C
CX650C	**1983** : RC110 - DM000018 onwards	Custom. Electronic ignition, automatic cam chain tensioner, twin piston caliper brakes, rear disc brake. All 650s thermostatically-controlled electric cooling fans.
CX650E-D	not available, but a correspondent quotes RC122002050 as a valid UK frame number. More welcomed 1983-86	UK Eurosport variant. Electronic ignition, automatic cam chain tensioner, twin piston caliper brakes, rear disc brake. UK registrations are Y, **A, B** and C.
GL650	**1983** : RC100 - DM000004 onwards	650 variant of the GL500.
GL650 D2-E	RC10E - 41001 onwards	ditto
GL650I	**1983** : RC101 - DM0000018 onwards	Silver Wing *Interstate*
CX650T **"Turbo"**	**1984-6**	Faired turbocharged variant of CX650 Eurosport. 1,777 built, with 1,749 shipped, of which 150 came to the UK. Imports have headlights permanently on; UK models can turn them off. 120 bhp. UK registrations **B**, C, D

CX / GL 500 / 650 Interchangeability Chart

This page attempts to show all parts which are interchangeable between the various models. It also includes a chart of the parts which have been found NOT to be interchangeable.

Since this page is likely to influence other owners in choosing parts and equipment, I have to insist that you ***personally*** vouch for every item you submit; so ***no folklore or hearsay***, please. It's useless to say that *"a friend of a friend fitted a woozer from a CX500Z to a GL650."*

Please **email me** with new items; I'll credit all submissions to the donor.

I am very receptive to comments and suggestions, but you use these pages entirely at your own risk.

ENGINE, CLUTCH and GEARBOX

PART	FROM	FITS	Info from
Piston Rings	Honda Integra car	CX500 engines, provided that the top ring groove is machined out from 1.2mm to 1.5mm. They were a lot cheaper.	Mark
Rocker box covers	Interchangeable between 500s and 650s, but use the original bolts as they are different lengths.		Jim T
Choke cable	Honda CB250 / 400 T "Dream" and N "Superdream"	CX500 ZABCD	Stephen Lloyd
Starter Motor	Completely interchangeable between all CX and GL models. Kathy Leslie adds some useful extra information.		Sidecar Bob
Engine	Interchangeable between the CX650 and GL650, but you'll need the ORIGINAL shaft drive output shaft.		Dick (in Raleigh)
Engine	500 Eurosport, complete with auto cam chain tensioner	ZABC chassis, provided you fit the ZABC rear engine case, stator, alternator rotor and CDI, and block up the redundant cam chain tensioner adjusting aperture.	Author
Cam chain	Interchangeable between 500s and 650s		Odie

COOLING, WATER PUMP and RADIATOR

PART	FROM	FITS	Info from
Mechanical seal	Yamaha p/n 11H-12438-10	Any 500 or 650 including Turbo, with a 28.28mm mechanical seal aperture	Author
Radiator cap	Standard car part @ 13 psi	all CXs and GLs	Sidecar Bob
Radiator Cap (UK)	Halfords p/no HRC608 Motorists Discount shop, p/n FC55		Ken
Thermostat (UK)	Halfords p/no HTK605		Hugh
			Shep
	Falcon p/no FTH115K		Andy Thellman
Thermostat (USA)	Honda Civic car, 1970s		Sidecar Bob
	Stant p/n 29958		David Threlkeld

FUEL, CARBURATION, OIL and LUBRICATION

PART	FROM	FITS	Info from
Oil filter spring	Kawasaki p/n 920811018 (£UK1.35)	CX500, GL500	Ken Roberts
Oil filter washer	Kawasaki p/n 920221022 (£UK1.39)		Ken Roberts
Oil Filter (US)	WIX p/n 24938	CX650 c/w o-rings	Honda Will
Carburettor diaphragms	CB750 and 900 DOHC models	CX500 ZABCD, EC	Rick (Halftopper)
Fuel Filter	Halfords Fuel Filter p/n HFF204, £10.49	CX500 Turbo. You need to slide ½" of aquarium pipe over one of the filter's pipe stubs, to enlarge its diameter, as the bike has a slightly larger diameter fexible pipe.	Author
O-ring around the inner rim of the differential oil inspection hole cover	All CXs and GLs	The base of the 'bottle' type engine breather, which screws into the timing aperture. This breather is fitted as standard to the Bs and Cs but is a modification on the Zs and As	Kathy Leslie

FRAME and FORKS, INSTRUMENTATION, FAIRINGS

PART	FROM	FITS	Info from
Clocks	CX500 Custom	CX400 Custom	Odie
Saddle	CX500 ZABC	CX500C, provided that you retain the undersaddle mounting bracket which bolts on to the rear upper subframe	Trev Hadley
Front fork seals	CB750	GL500 and probably many other similar capacity Hondas	Sidecar Bob
Front fairing	GL1100	GL500	Sidecar Bob
Vetter Fairing	CX500D 1979	CX500C 1982	Craig, who says:-
"I had to switch the mounts around a little, and dent the bottom of the tank to gain an eighth inch of clearance, but it fits. The lowers don't fit well with crash bars installed. But the electricals were all colour coded the same."			
Rear footrests and brackets	CX650EC	CX500 Turbo and probably all Eurosport types	Author

WHEELS, BRAKES and TYRES

PART	FROM	FITS	Info from
Front brake master cylinder	Kawasaki GPZ 500/750	CX500Z, A, B	Reggie
Twin piston front brake calipers	GL500	CX500Z, A, B, C (twin shock models). You also need to fit the caliper brackets and hoses.	Moz
Rear wheel	CX500B	CX500C	Sture, who says:-
"Some years ago I owned both a standard CX 500 (B) and a 500 Silver Wing ... tried the CX rear wheel for a week to reduce the revving a little and liked the change in revs. No clearance problems. When on the side stand the bike leaned more on it than before and it almost jumped up on the main stand by itself. Another member did the same swap and modified the stands."			
Master cylinder seal	Yamaha RD350	GL650	Skippy, who says:-
"You may like to add that the master cylinder seal (that sits under the bolt down plate you need to remove to top up the hydraulic fluid) on a GL560 is the same part that Yamaha use for their RD 350's and is about one third of the price!"			

Front brake calipers	Honda CB900 (1980s, single pot type)	CX500ZABC (single pot type) but use the 900's banjo connections at the caliper ends	Shep
Brake discs (FRONT only)	VF500 84-85, VT500 83-84, and the VT700 86-87	CX650. The rear disc however is unique.	Kenton Ortega Chicago Illinois, USA
Brake discs	Honda CB250 / 400 T "Dream" and N "Superdream"	CX500 ZABCD	Stephen Lloyd
Rear brake caliper	CX650	Front left brake caliper CX650, and vice versa	Odie
Front wheel bearings	Interchangeable between all models		David Threlkeld, who says:-
"Front wheel bearings are standard 6302 double seal bearings. It seems to be the same for all models. Some have Z, U, or UU at the end. Different manufacturers use different designators for shielded, sealed, double seal, etc. Just ask for 6302 double seal."			

ELECTRICAL, LIGHTS and IGNITION

PART	FROM	FITS	Info from
Regulator / Rectifier	CXs with CDI ignition	CB250T Dream, CB250N, NA, NB Superdream	Odie
CDI unit	Black and gold CDI units are interchangeable		Ron in Califormia
Tail light	GL1100	GL500	Sidecar Bob
Igniter Units	CB750 and 900 DOHC	CX650	Rick

MISCELLANEOUS

none yet!

THE FOLLOWING PARTS HAVE BEEN FOUND *NOT* TO FIT:-

PART	FROM	DOES *NOT* FIT !!	Info from
Mechanical seal	Yamaha p/n 11H-12438-10	Any 500 or 650 with a 27mm mechanical seal aperture	Author
Front Mudguard (fender)	GL650	GL500, as the 650 mudguard does not have the built in fork brace	Jim T

<table>
<tr><td>Centre stand</td><td>CX500</td><td>CX500E (Eurosport)</td><td>Fiona</td></tr>
<tr><td>Saddle</td><td>CX500C</td><td>CX500 Z, A, B. The C saddle cannot accommodate the tailcone from the other models.</td><td>Trev Hadley</td></tr>
<tr><td>Radiator</td><td>Eurosports and 650s</td><td>CX500 Z, A, B, C, D. The top hose is centrally mounted on the Euro radiators, and is on the left on the other models.</td><td>Author / Ian Smith</td></tr>
<tr><td>HT Coil</td><td>Transistorised ignition variants (GL500, Eurosports and all 650s)</td><td>CDI variants (Z, A, B, C, D) (and vice versa)</td><td>Don (in Australia), who says:-</td></tr>
<tr><td colspan="4">"NEVER try the 1982 coils on a pre 1982 bike - besides the different primary connections, the primary resistance is about 3 times as high on the transistorised ignition coils, and the secondary is treated differently, too."</td></tr>
</table>

Polishing The Aluminium

WARNING. Do not enter this site unless you have available a large quantity of ***Elbow Grease***.

Skill Level : 1. Personally dirty : 3. Work mess : 2. Tools : 1. Space : 1.

I've wanted to improve the cosmetic appeal of my CX500A by removing various parts of the aluminium alloy and then polishing the metal back to as near an original state as I can. I began with the radiator shrouds, and was encouraged by the result, so I carried on with a spare set of fork legs that I have been meaning to renovate and fit on my bike.

I don't claim to be an expert aluminium polisher and I don't have an unlimited amount of time or effort, I just want to make the bike look more "sparkly" and get rid of the 20+ years of accumulated surface corrosion. However the work proved more than a trifle addictive.

The trouble is that you polish up the radiator shrouds (left), then the fork legs look tatty. You polish up the fork legs and then the wheels look tatty. You polish up the wheels and then ... you get the picture?

Technically and toolically, it's easy. You don't need any more tools than heaps of medium and fine sanding paper and some considerable time.

One absolutely vital component, of which you will need copious amounts, is ***Mk 1 Elbow Grease***. Have you heard of Housemaid's Knee? You are in danger of getting Aluminium Polisher's Elbow.

However, having said that, you can get quite good results by vigorous use of a Scotchbrite pad - the green rough scouring pad which any supermarket will stock. Give the aluminium parts a good going over with that, and then polish with Solvol Autosol or suchlike. If you want a better or mirror finish, read on ...

I had an almost complete CX500 front end, from which I removed the wheel, brake calipers and mudguard. In my work area I covered the table with layers of newspaper. You won't make an oil mess, but you will generate a lot of dust. I didn't bother with a dust mask but if you are asthmatic it would be a good idea to wear one, and try and have the windows open.

Original state of the fork leg (right) is pretty gruesome. Loads of ingrained dirt, plus 20-odd years of surface aluminium oxidisation, especially on the wheel side, and around the bolt

holes for the mudguard and in the nooks and

crannies (left). Firstly, degrease the part and use a stiff wire brush to remove any surface dirt.

These days I generally wear surgical gloves for mechanicky jobs. Use the medium paper to firmly rub down the entire area of the component, getting well into the crevices. Try and avoid rubbing so hard that you produce surface scratches, and keep moving the part round so that the rubbing action covers all directions.

To reach into corners, fold the paper into a knife edge, and to get concentrated effort into a stubborn area, make a bowed circle out of one edge of the paper and use that to tease out the surface oxidisation.

If you get scratches, rub them down in the opposite direction, and then in all directions until they disappear. Minor scratches will come out when the part is fine-papered.

It is a real tough job getting into all the crooks and nannies ... this is where the elbow grease comes into play. You'll need loads of this. I spent a whole afternoon rubbing down just one fork leg.

After all-over work with the medium paper, the fork leg looked like this (right) with the other untreated leg above it for comparison.

The dark patch is my shadow, not residual oxidisation on the fork leg. There are still some surface scratches evident from the medium paper, but you can see where the metal looks so much better even after this first stage.

Once all the surface oxidisation is removed - several hours' work even for the small components - then repeat the dressing, this time using the fine paper. This will generate a lot of dust and you may need to treat the surface area several times. If any missed oxidisation shows up, tickle it out with medium paper and rub it down with fine.

In the final stages, you can use the fine paper quite vigourously to rub out any remaining scratches or abrasions from the medium paper, and the end result should be a very smooth aluminium face to the component. To test this, rub it against your cheek; you are seeking a baby's bottom type finish.

Lastly ... use a metal cleaner/polish. Solvol Autosol is brilliant on chrome but doesn't perform well on aluminium. I prefer Mother's Mag polish, and even more elbow grease, to buff up the metal. This can take two doses to remove all the dust and grime, and bring the metal up to a good finish (right).

A word about power tools. It's very tempting to use a Dremel or hand-held electric device (and for UK readers, Focus DIY's Dremel-clone is £20 against £80 for the real article) to try and accelerate the polishing process. You can also buy accessory boxes of grinding wheels, polishers, etc for these.

BUT I found that unless you have a bench grinder with an extremely soft buffing wheel, it's quicker and safer to do the job by hand. The Dremel-like tool can slip all too easily, and gouge out considerable chunks of aluminium alloy. Even the most delicate of hands will inevitably slip and do damage to the component, or the hands holding it.

I also found that even the final buffing process wasn't helped at all by a power tool. There really is no substitute for elbow grease, I'm afraid. But as I said, the end results are worth the effort. Several correspondents have said that a n ordinary power drill, or a bench grinder, fitted with polishing or buffing wheels, does take a lot of work out of the job.

As for doing those ribbed engine casings ... bloody good luck ... all those crooks and nannies ... ***aaarrghhhh!*** But the technique is still the same for any component.

Sidecar Bob says:- "Here are some extra tips. 1) I usually start with methanol (methyl hydrate -

sold as thinner for shellac) and a plastic scrubbing pad (Scotchbrite works best). The methanol will lubricate the pad and dissolve any old lacquer. This works best for deep corrosion - the white fluffy kind. CAUTION: good ventilation is a must (fumes) and NEVER SMOKE NEAR FLAMMABLE SOLVENTS.

"2) We have a product in North America called "Mothers Mag and Aluminum Polish" that works wonders. My GoldWing sat outside for a long while before I got it - the fellow I got it from had to cut down a small tree that had grown up between the engine and crash bar before he could move it! The forks were about as bad as the ones you show. I polished them with Mothers, and I almost feel like I cheated - you just rub it on, let it sit a couple of minutes, and polish it off with a clean rag. Repeat if necessary (it took 3 or 4 applications for mine). Mothers seems to lift the oxidation out of the aluminum - it goes on white and comes off black, and you don't much elbow grease. I did them several years ago, and they still look like new."

I tried Mother's Mag and found it excellent.

You are welcome to **comment** on these pages.

CX500 / GL500 / CX650 / GL650 Servicing Quick Reference Page

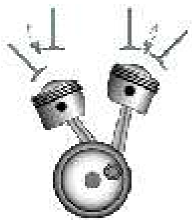
print this and pin it up in your garage / workshop

Item	*500 Z, A, B, C*	*500 Euro*	*GL500*	*650 Euro*	*GL650*
Inlet valve clearance	**4/1000" / 0.1mm**	**3/1000" / 0.08mm**		**4/1000" / 0.1mm**	
Exhaust valve clearance	**5/1000" / 0.12mm**	**4/1000" / 0.1mm**		**5/1000" / 0.12mm**	
In all cases, set the valve clearances TIGHT so that the feeler gauges can only just be withdrawn					
10mm Tappet locknuts	**11-13 ft lbs / 1.5-1.8 kgm**			**14½-18 ft lbs / 2-2.5 kgm**	
10mm rocker box retaining bolts	*Technically,* **6-9 ft lbs / 0.9-1.2 kgm** *but these bolts these get a lot of use and are very easily stripped. They don't need to be tightly fastened - finger tight and a gentle tweak on the spanner is all they need.*				
17 mm Oil drain bolt & 12 or 17 mm Oil filter retaining bolt	**14½ - 18 ft lbs / 2-2.5 kgm**				
Tyre Pressure front (cold)	**CX500Z 25 psi / 1.75 kgcm^2** **all other 500s 28 psi / 2 kgcm^2**			**32 psi / 2.25 kgcm^2**	
Tyre Pressure rear (cold)	**28 psi / 2 kgcm^2**			**32 psi / 2.25 kgcm^2**	
Tyre Pressure rear (cold, with pillion passenger)	**32 psi / 2.25 kgcm^2**			**40 psi / 2.8 kgcm^2**	
Cam chain adjuster locknut	**6-9 ft lbs / 0.9-1.2 kgm**	**auto**	**6-9 ft lbs / 0.9-1.2 kgm**	**auto**	
Item	*500 Z, A, B*	*500 Euro*	*GL500, C*	*650 Euro*	*GL650*
DO NOT USE AN AIR LINE TO INFLATE AIR SUSPENSION - ALWAYS USE A HAND OR FOOT PUMP AND GO GENTLY !					
Front fork air pressure	**na**	**11-17 psi / 0.8 - 1.2 kgcm^2**		**0 - 6 psi / 0 - 0.4 kgcm^2**	**6 - 17 psi / 0.4 - 1.2 kgcm^2**
Pro-link monoshock air pressure	**na**	**0-71 psi / 0 - 5 kgcm^2**			
Sparking plug	**NGK DR8ESL (UK) or D8EA (USA)**			**NGK DPR8EA-9**	
Sparking plug gap	**24-28/1000" / 0.6-0.7mm**			**32-35/1000" / 0.8-0.9mm**	
Fuel capacity including reserve. Litres / US Gallons / Imperial Gallons	**17 / 4.49 / 3.74**	**19 / na / 4.18**	**12 / 3.17 / 2.64**	**19 / na / 4.18**	**12 / 3.17 / 2.64**
Fuel reserve. Litres / US Gallons / Imperial Gallons	**3.5 / 0.93 / 0.77**	**2.5 / 0.66 / 0.55**			
Oil capacity (oil & filter change). Litres / US Quarts / Imperial Pints	**2.6 / 2.75 / 4.58**			**3.1 / 3.28 / 5.46**	
Oil capacity (after engine rebuild). Litres / US Quarts / Imperial Pints	**3 / 3.17 / 5.28**			**3.6 / 3.8 / 6.36**	

Coolant capacity. Litres / US Quarts / Imperial Pints	**2 / 2.11 / 3.52**			**2.08 / 2.2 / 3.66**	
Item	***500 Z, A, B***	***500 Euro***	***GL500, C***	***650 Euro***	***GL650***
Front tyre size	**3.25S - 19 4PR**	**100/90 - 18 56S**	**3.50S - 19 4 PR**	**100/90 - 18 56H**	**3.50H - 19 4 PR**
Rear tyre size	**4.10S - 18 4PR**	**120/80 - 18 62S**	**130/90 - 16 67S**	**120/80 - 18 62H**	**130/90 - 16 67H**
Cylinder head (black) bolts	**36 - 40 ft lbs / 5-5.5 kgm**		**36 - 43 ft lbs / 5-6 kgm**		
Torque for head size of nuts and bolts - general	**8mm 6-9 ft lbs / 0.9-1.2 kgm** *but easily stripped - use minimum where possible* **10mm 9-11 ft lbs / 1.5-1.8 kgm** *but easily stripped - use minimum where possible* **12mm 11-13 ft lbs / 1.8-2 kgm** **14mm 13-14½ ft lbs / 2-2.5 kgm** **17mm 14½-18 ft lbs / 2.5-3.5 kgm**				

The Fountain Of Wisdom

CX500, GL500, CX650, GL650



Owners' Tips and Tricks

This page is meant as a general repository for all hints, tips'n'tricks and general information which owners have found out - usually the hard way. It's divided up into sections as per the Haynes Manual. At the moment all the contributions are on one page, but as the sections grow, I will split them into individual pages.

Please feel free to **email me** with your own contribution, which will be credited to you.

ENGINE, CLUTCH and GEARBOX

"***If you're having difficulties selecting neutral***, try going into neutral a split second before you actually stop. Rotation of the final drive / shaft etc. seems to make it a lot easier to find!" ***Nick Eastop, UK, 24-Apr-2003*** Also adjust / renovate the clutch***.***

"To make it easy to see the oil level on your dipstick, take it out, wash and clean it. Paint the "measurement" area with silver model paint. Let it dry completely. Makes it very easy to see the oil level. I've never had any paint flake off in 4 years of daily riding." ***Wayne Cornell, Glendora, California USA. 4-Aug-2003***

"Always prime the lube system before reinstalling the motor after any engine work. To achieve this, remove the plugs and engage the starter motor; spin up until oil pressure is achieved (oil light goes out) or oil makes its way out of the rocker arms. 20-30 seconds on the button should do it. If you can't get sufficient pressure find out what's wrong, before continuing." ***Andy Green, UK. 12-Oct-2004***

"Here is some info for anyone trying to determine the ***big-end shell bearing size for the 650 engine***. The crankshaft has 2 letters stamped onto the balance weights; the letter closest to the con rod relates to the diameter of the crankshaft big end bearing (the other letter relates to the diameter of the crankshaft main bearing). The letter will be either A, B or C. On the machined surface of the big end/end cap, is a number – 1, 2 or 3. These numbers relate to the diameter of the big end eye of the con rod. The combinations of these numbers and letters are arranged in a table to give a colour code for each combination." ***Andrew Parry, UK, 18-Apr-2006***

"If you can't find a genuine long shank CX sparking plug spanner with the rubber insert, squirt some silicon sealer into the end of an ordinary plug spanner and then wrap a sparking plug in cling film and stuff it in, then leave it for a couple of days to dry out and form a perfect shape." ***Reg Worth, Bristol, 05-Aug-06***

COOLING SYSTEM

"***When changing hoses***, take the old parts to your local auto parts dealer - he can supply them for much less than your Honda motorcycle dealer. The thermostat is the same one used in late '70s Honda Civics and the radiator cap is a standard automotive 13psi." ***Sidecar Bob, Canada. 9-May-2003***

"An erratic or misbehaving temperature gauge is often caused not by a cooling fault but by the bike's battery being below par. Charge or replace your battery and see if the problem goes away, before attacking the radiator, thermostat or cooling system." ***Colin, Stotfold Rally 2003***

"When replacing the mechanical seal with either the Honda or Yamaha one, beware because there are two different sizes of aperture (normally 28mm) in the rear crankcase cover. The smaller one (27mm) is no more that 1mm difference in diameter, but it makes the genuine or the Yamaha replacement seal impossible to fit." ***Ian, Alvechurch UK, 31-May-2003***

"***If you are buying antifreeze from Halfords***, their own label comes in two types. It is the "Advanced" type you need, this states on the rear of the bottle that it's silicate-free. It has a distinctive yellow-orange colour quite unlike the normal blue antifreeze. Mix it 50/50 with distilled (battery top up) water." ***Author***

"If your temperature gauge tells you the bike is overheating, before taking the cooling system apart, check the output on the voltage regulator. Take the headlamp unit out and you'll see it's a yellow wire with an eyelet fastened to the long stud at the back of the gauge ... OR ... the sender wire (Green/Blue) runs between the carbs and heads and has a connector that can be opened and the voltage checked there with the ignition on. I've done it in situ, but you may want to lift the tank for easier access. This should read 7V or very close to that. I've seen a few give out about 10V which overdrives the gauge. This isn't apparent until the engine starts to warm up. Then the needle creeps all the way over to hot." ***Reg Worth, Bristol UK, March 2006*** Also check that the thermostat bracket is earthed, as a powdercoated bracket will insulate it from the frame! ***[Author]***

FUEL SYSTEM and LUBRICATION

"***If your bike is refusing to start***, remove the air filter and spray some WD40 directly into the air intake of the carbs. As the WD has a greater 'octane' than petrol and is already vapourised, it ignites much more readily than petrol. It also has the added benefit of cleaning out gunge from the carbs and done regularly can contribute to cleaner carb internals. Redex only affects the petrol side of the carbs and doesn't touch the air side of things. Spraying WD40 into the carbs when the bike refuses to start also aids the spark plugs to do their job by cleaning deposits from them, as well as repelling any water that may have accumalated. Of course its no substitute for cleaning your plugs, but helps the starting process." ***Gary Claus, Waterlooville, UK. 5-Apr-03***

"***If you have a vacuum operated fuel tap*** - and it works correctly, and the bike has been standing for at least a week, the following trick can help you starting it. Loosen the 2 carburettor drain screws to get rid of the old petrol from the carburettor bowls, then tighten the screws. Detach the inlet manifold side of the vacuum pipe, and apply some negative pressure by sucking on the tube end for a couple of times - with a syringe or your mouth. This mimics the running of the engine, to fill the carburettor bowls with fresh petrol. Re-attach the vacuum tube to the inlet manifold, and start your engine. My 500EC after sitting for months starts always in 2 seconds on both cylinders using this technique." ***Krisztian Kaldi, Hungary. 14-Apr-2003***

"***To repair a hole in the fuel tank,*** buy some JB WELD at £4 a pack from Halfords. I used it on my tank and never had a sniff of petrol out since. Just clean up the area you are applying it to, add copious amounts, and bingo. Once it's set you can forget about it. I had a tiny hole in the tank, I actually enlaged the hole slightly to about 2-3mm in dia. This cleared off the really corroded metal and also made the hole larger. Making it slightly larger allowed me to put some JB Weld in a 50ml syringe and then inject it slowly through into the tank. This allows you to get a seal from both sides, inside and out. Position the tank so that the leaking area is the lowest point so that the weld sets in place and does not run off inside the tank." ***Fiona, Leeds UK, 23-Apr-2003***

"If you have cracked rubbers on your inlet tracts, get a section of an old bicycle inner tube and persuade it to go over the black part of the tracts, then trim off the excess. This is almost completely undetectable and works perfectly at sealing any of the thin cracks that seem to develop." ***Maurice McAllan, UK, Jan 2004.***

To replace perished or damaged rubber seals at the base of he carb bodies, use the end-stoppers from "Bic"-type ballpoint pens as these will do the job. They are polyethylene, unaffected by petrol and additives, press into place, and "grippy" enough not to drop out. ***Colin, May 2005***

IGNITION SYSTEM

"***Buy your spark plugs from a back street lawn-mower shop*** as they are not trying to rip us off (£3 for a set of plugs for my 650) and they can do you replacement copper cored H.T. lead by the foot and also make up replacement cables for you." ***Rick Hoad, Derby UK, 24-Apr-2003***

EXHAUST SYSTEM

"***I use bathroom sealer as exhaust paste***, it helps to get every thing to line up and when it burns off it seals the exhaust (told to me by a friend of mine who goes drag racing)" ***Rick Hoad, Derby UK, 24-Apr-2003***

"***To repair holes in a leaky exhaust*** system, use GRIPFILL. It is easily obtainable from builders' merchants, and at around £3.00 per tube is much cheaper than a specific exhaust repair product. Also, it fits a standard caulk gun. However, don't use it to seal junctions on your pipes if you ever want to get them undone again! As it is a solvent based product, the heat from the exhaust dries it out and it sets like concrete. I have used it on car exhausts and it has out lasted the life of the car!" ***Gary Claus, Waterlooville, UK. 16-May-2003***

HOW TO MAKE YOUR OWN "ASBESTOS SEALS". These are the circular shiny seals which fit over the throats of the downpipes and silencers, where they meet and go into the H-box. The Honda ones are about a fiver each and they tend to go crumbly, or just get rumpled up and disintegrate. Then you get exhaust stains over the chrome clamps as well as popping on the over-run. To find a leaking asbestos seal, wrap an old towel tightly around each joint in turn, whilst running the engine. When the engine note changes, that's where your leak is. A leak here sounds almost exactly like tappet rattle. Take a yard of bog standard kitchen cooking foil and fold it into a bandage-like strip 3/4 of an inch wide. Clean up the downpipe or silencer throat, and wrap the foil bandage tightly around it. Finally wrap one thickness of Halford's (or whoever's) exhaust repair material over the whole thing.

I've also used, instead of aluminium kitchen foil, the very thick silver trays in which takeaway meals are often delivered. These are excellent for the purpose of making h-box seals. I've even used them to completely cover the very rusted exhaust header pipe and waste gate heat shields on my 500 Turbo. WIth a flap of an extra inch of metal all round the original shape, and then bent over and crimped, they are still play a year afterwards with so signs of heat damage.

If it's a silencer, there is a water drain hole in the underside of the silencer body, make sure this hole is not obstructed, you may have to poke a slim screwdriver through the home-made seal. The exhaust repair stuff is a roll of what looks like very thick silver sellotape, on a roll. You peel off a length, strip off the sticky back and stick it on whatever you like. When you've attached the home-made seal, you'll find that it's a trifle thicker than the Honda asbestos seal and you may have to gently ease apart the four flaps at the rear or the H-box, and wriggle in the silencer throat, don't forget to fit the chrome clamp ring first, or you'll have to unscrew it to get it on! The downpipes generally fit straight in, as the H-box here seems a little wider. The home-made seals cost pence to make and they don't crumble. If they get damaged, just unpeel them and make a new one.
(Author, 30-Dec-2003)

FRAME, FORKS and HANDLING

"Whilst trying to cure some vagueness in the bike's handling, I slid my bum about two inches further back along the saddle, which lowered my head by about an inch. I noticed that the "tracking" feeling had almost completely vanished! Previously I had been riding with my crotch just about as far forward on the saddle as it was possible to get and I'd been wondering why Honda had made the knee indents in the tank too short. My predjudiced assumption of the character of the bike had made me adopt an upright riding position, not thinking that it might actually have been designed with a more sporty attitude. I'm surprised by the way, that such a small difference in weight distribution can have such a big effect, maybe the fact that I'm leaning more heavily on the steering contributes? If your bike has some strange directional uncertainty, try varying your riding position." ***Nick Eastop, UK***

"To balance your own wheel after fitting a new tyre, make sure the tyre is on correctly - there is usually a spot of paint on the sidewall of a new tyre - this marks the lightest point of the tyre, so this spot should be next to the valve. Remove any old weights. Put the axle back in the wheel and support it at each end of the axle, so the wheel can turn freely. Spin the wheel and chalk-mark the lowest point after it's stopped. Do it a few times, marking the lowest point each time. If the wheel is balanced, these marks will be all over the place, if it's not they'll be concentrated on one side, this is the heavy point. All you need to do is add weight to the opposite side to match, we're only talking a few grams. One indicator of how much weight is the density of chalk marks - the closer they are together the greater the weight difference is likely to be. Add weight, remove old chalk & spin that wheel again until the marks are all random - job done.

"On my old spoked wheel bikes I used solder wrapped around the rim end of the spoke with a light touch of the soldering iron to secure it once balanced. With Comstars you're better off getting hold of the stick-on weights they use in Kwik-fit and the like - I've sweet-talked a handful out of the guys when in getting my car tyres done - it's even easier sending the wife in with a button or two missing from her blouse!" ***Pete W, August 2005***

"For rechroming, try Cradley Plating Co, Woods Lane, Cradley Heath, Warley, West Mids. Email cradley@fsdial.co.uk. Tel 01384634111 and Fax 01384413110. I've seen their work and it's immaculate." ***Richard Todd, Telford UK, 29-Oct-2003.***

"***If your forks are pitted or damaged***, seals leaking etc, I had good service from **Pitted Forks**. Their price includes collection, rechroming, new seals and oil, and redelivery." ***- Aircoolednut, UK, 9-Jul-2003***

To replace the shaped rubber grommets which hold on the side panels, take an old oil filter and prize out one of the old rubber grommets / sealing rings. De- grease and dry it and then cut it in two. Each half can be inserted / bent into a Side Panel hole (left). Glue with Bostick or Superglue for a nice little job. ***Shep, Hull UK, August 2004***.

"To repair a mounting stud or any part of your plastics, I repaired mine with a GREAT product called **PLASTEX**. A while back, I took the sidecovers off to clean & check the battery and air cleaner. I noticed there was a crack starting on one of the rear support pegs. I've read where this is a common problem with the sidecover pegs. Luckily mine was not cracked all the way. I've had my cover off a number of times to check it, and it is perfect. Many, many miles on it also. Product is easy to use & apply, and holds like it was welded, I highly recommend it for anything made with ABS material." ***Wayne, 16-Nov-2003***

"To ft that tough mainstand or sidestand spring, clamp one end in a vice, or hold it fast with a Mole wrench. Now bend the spring hard over and slide a series of slim washers between the opened coils. Reverse the bend and do the same on the opposite silde of the coils. This lengthens the spring by as much as 1" and makes fitting it over the stand and frame lugs very easy. As soon as the stand is extended, the washers usually just fall out, if they don't, just pull them with pliers." ***Howard Bell, Telford, July 2004***. (Author's note : this technique is brilliant and works extremely well!)

Handlebar shake at low speeds is caused by worn headstock bearings. Remove and replace with tapered roller bearings. ***Author, August 2005***

WHEELS, BRAKES and TYRES

"Bearing stockists are good for your front and rear wheel bearings (don't tell them what it's for, but take the old one with you for them to measure) got the fronts for the trike for £5 the pair!" ***Rick Hoad, Derby UK, 24-Apr-2003***

"***Friction Hydraulic Services of St George's, Telford (01952 615793)*** made me up a set of 4 made-to-measure stainlees steel brajke hoses for my 500 Turbo, and with two hydralic brake light switches, charged me only £70. They also supply o-rings and suchlike." ***Author, 10-Mar-2007***

ELECTRICAL SYSTEM

"***A blown main 20-amp fuse stops all your electrics*** - indicators, lights - as well as the starter motor - from working. Your engine will continue to run, so if you have to switch off the engine, stop at the top of a slope so you can bump-start the bike. If you can't obtain a 20-amp fuse, and you are ***sure*** you don't have a short circuit which might cause a fire, wrap silver paper round the fuse and replace it in the connector by the battery. Another dodge is to use a piece of domestic 30-amp fuse wire - but this is strictly a get-you-home solution, as a 30-amp fuse will not blow if a serious electrical fault develops. A 15-amp with a 5-amp piece is better. Always carry spare main and secondary fuses in your travellling toolkit." - ***Author***

"***Trailer shops are good for bulbs*** (not head light), cable ties, and electrical connectors." ***Rick Hoad, Derby UK, 24-Apr-2003***

"If you have a blowing main fuse, and the wiring around that area is hot - but you can't find a short circuit - change the starting solenoid. I learned that these things tend to corrode and can get 'sticky' when they get old. If this happens, it keeps drawing amps. And this caused the wiring and fuse holder to heat up." ***Floris Bongearts, Holland, 18-Aug-2003.***

"If your indicators don't flash, or flash at the wrong speed / erratically, check that working 21 watt bulbs are fitted in the bulb holders, as lower wattage bulbs don't draw enough current to make the flasher unit work. Also check that it's the correct flasher unit. Some aftermarket ones have a third (earth) connection, but the CX/GL ones don't need this." ***Author, August 11th 2005***

MISCELLANEOUS

"***A really convenient place to keep a rag or cloth*** is stuffed in behind the rear right engine casing, directly over the shaft drive housing and next to the coolant overflow bottle. It's great for when you need to wipe your dipstick, clear up minor spills or drips, or as a hand-warmer when you stop!" - ***Author***

"To clean dead and squashed flies off your visor, soak a panel of kitchen roll in tapwater and press it over the closed visor. 10 minutes later, the squashed insects will come away with a gentle wipe, without any scratching." ***- Author***

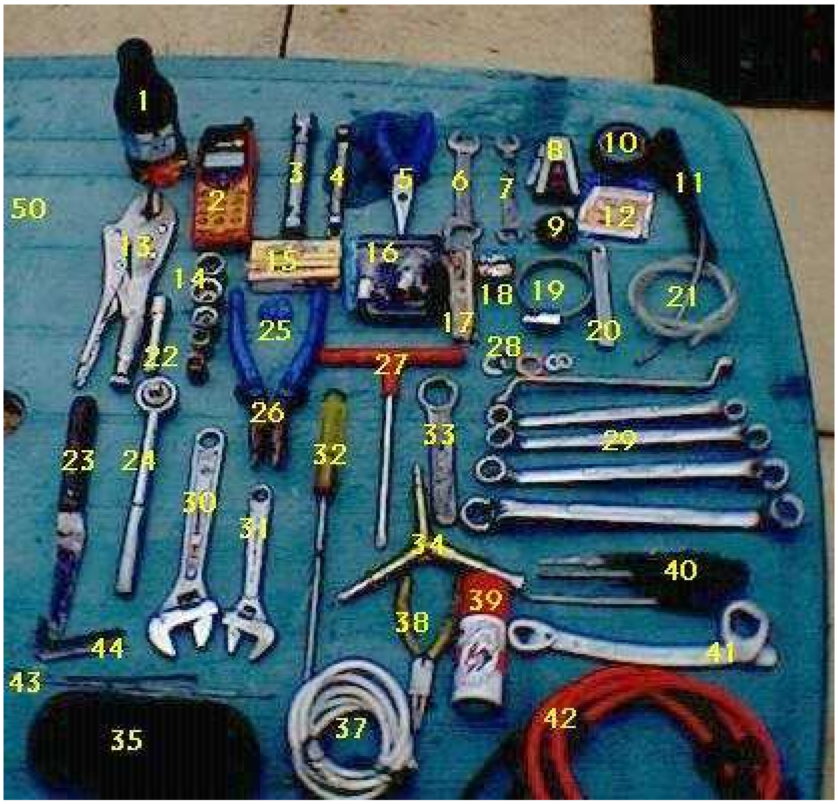
"Wipe the inside of a visor on a crash helmet with some washing up liquid on a piece of tissue. Then wipe off with another clean tissue, not water. Anti-mist film is left against breath in the cold weather." ***Shep, UK, October 2004***

Rob's Travelling Toolkit

IF YOU SEE ANOTHER RIDER IN TROUBLE - STOP AND HELP - YOU'LL MAKE A FRIEND - AND TOMORROW IT MIGHT BE *YOU* NEEDING HELP

The DISTRESS SIGNAL is placing your helmet by the rear wheel.

This is my insurance against never breaking down - I stop and help - and here's what I usually carry.



These are either in the tailcone, or a plastic tool holder in my top box. ***1*** Emergency bottle of engine oil; ***2*** mobile phone (in riding jacket); ***3*** spark plug wrench; ***4*** tommy bar; ***5*** slim pliers; ***6*** 14/17mm open spanner; ***7*** 10/12mm open spanner; ***8*** spark tester; ***9*** spark plug feeler gauges; ***10*** insulating tape; ***11*** spark plug wire brush; ***12*** fuses; ***13*** Mole self locking wrench; ***14*** socket set; ***15*** spare spark plugs; ***16*** spare rear bulbs; ***17*** plastic metal; ***18*** Hylomar tube;***19*** Jubilee clamp; ***20*** feeler gauges; ***21*** plastic petrol tank pipe; ***22*** extension bar; ***23*** knife; ***24*** ratchet handle for sockets; ***25*** inline connectors; ***26*** heavy duty pliers; ***27*** T-handled screwdriver; ***28*** selection of washers; ***29*** set of ring spanners; ***30*** large adjustable wrench; ***31*** small adjustable wrench; ***32*** long thin screwdriver; ***33*** axle (22mm) "castle nut" spanner; ***34*** Y-driver; ***35*** spare glasses; ***37*** electrical flex; ***38*** very slim nosed pliers; ***39*** visor / glasses antifog and cleaning aerosol; ***40*** selection of screwdrivers; ***41*** magic spanner; ***42*** bungee straps; ***43*** cable ties; ***44*** Allen keys. ***50*** - the garden table - I don't usually carry this with me!

One useful extra item, which I don't carry but have at home, is a dental mirror on the end of a short wooden stick. This lets me peer into the inside of engines and other difficult-to-see places. Ask your dentist if he has an old mirror, as these are replaced regularly.

It's especially handy for checking CX cam chain and adjusters, as you can insert it through the timing aperture, and twist it to see the top of the tensioner arm and most of the spring. If the tensioner blade breaks (apart from hearing the bad engine rattle) you'll see it easily.

Sometimes the tensioner sticks, and after loosening the locknut, you can poke it free with a screwdriver or your fingertip.

PLUS in the top box : cable lock; road map, copy of insurance/ MoT documents, Band-Aids, Paracetamol; I also carry a 6" Maglite and spare batteries.

TAKE THAT TOOL ITEM, AND YOU WON'T NEED IT - BUT ANOTHER RIDER MIGHT!

The Essential Torque Wrench

I encourage your comments and feedback, but you use these pages at your own risk.

A torque wrench is a tool which is adjustable to a certain level of force, measured in either foot pounds (lbf / ft) or kilogram metres (kgf / m). This simply means that a setting of 10 ft / lbs equates to ten pounds of force at a distance of one foot from the object being tightened.

Serious, expensive and extremely inconvenient damage results from nuts, bolts and screws being overtightened. Threads strip, bolts snap and as mostly the threads are cut into aluminium engine castings, a stripped thread generally means removing the engine and having a specialist workshop try and repair the damage - and this isn't always possible. *A stripped thread may well mean a new crankcase.*

TWs take all the guesswork out of tightening things. It's an invaluable part of any mechanic's toolkit, and just one saved stripped or broken thread means that the tool has paid for itself. It will save your bacon dozens of times in its life. Buy one, plus any adapter pieces you need to make it fit your range of sockets. For example the TW may be a 1/2" square drive but if your sockets are 3/8" drive you will need a cheap adapting piece.

Models of TW vary, but typically (left) it will have a winding wheel at the handle end which is turned one way or the other to adjust it, and a window which shows the desired setting. As it is attached to the object being tightened and force is applied, it gives a pronounced "click" and "gives way" when the preset force has been met. As soon as you hear the click and feel the "give", stop tightening. The object is now correctly tightened. That is why TWs are sometimes called "click-stop" wrenches.

This link takes you to a search on **Ebay** for "torque wrench". For the CX/GL motorcycles, the lowest setting you need is 6 ft / lbs, and the highest is 68 ft / lbs. A TW in the range 6 - 40 ft / lbs will do almost everything you need to do.

There is a cheaper, nasty model which instead of a click-stop has a straight bar which does not move when you tighten the object, but shows a pointer against a graduated scale instead. *Do not buy one of these* - they are not accurate enough, especially for the small nuts and bolts.

Always reset your TW back to the minimum setting when you have finished with it.

CX / GL 500 / 650 Most CommonTorque Wrench Settings

Bolt Description	**lbf / ft**	**kgf / m**
All models **chromed rocker box cover bolts** *and* **manual cam chain adjuster** locknut (10mm head)	6 - 9	0.9 - 1.2
CX500 **Valve clearance adjusters** locknuts (10mm head)	11 - 13	1.5 - 1.8
CX650 **Valve clearance adjusters** locknuts (10mm head)	14.5 - 18	2 - 2.5

All 500cc (except GL) **Cylinder head bolts** (14mm head)	36 - 40	5 - 5.5
All 650cc and GL500 **Cylinder head bolts** (14mm head)	36 - 43	5 - 6
CX (all models) **oil filter central bolt** (12mm or 17mm head)	14.5 - 18	2 - 2.25
CX (all models) **oil drain bolt** (17mm head)	14.5 - 18	2 - 2.25
CX500 (except E-C) **Engine mounting bolts** (10mm head)	13 - 18	1.8 - 2.5
CX500 (except E-C) **Engine mounting bolts** (12 mm head)	25 - 32.5	3.5 - 4.5
CX500 (except E-C) **Engine mounting bolts** (14 mm head)	43 - 50	6 - 7
CX500 (except E-C) **front mounting bracket nuts**	25 - 32.5	3.5 - 4.5
CX650, CX500 E-C and all GL500 variants **Engine mounting bolts** (12mm head)	32.5 - 50.6	4.5 - 7
CX650, CX500 E-C and all GL500 variants **Engine mounting bolts** (14mm head)	43 - 58	6 - 8
Final drive shaft pinch bolt all CX500 except E-C	13 - 18	1.8 - 2.5
Final drive shaft pinch bolt all other variants	13 - 20	1.8 - 2.8
Gear lever pinch bolt (10mm head)	7 - 10	1 - 1.4

You are welcome to **email** me.

Rob's Working Definitions

Level	Skill	Personally Dirty	Work Mess	Tools	Space
1	Dead easy! Grandma could do it	Slightly oily / dirty hands and fingers	None, or very minor drips and leaks	Basic ring and socket spanners, feeler gauges, torque wrench	Enough space to walk round the bike
2	Easy ... why pay a mechanic?	Oily / dirty hands and fingers	Drip / drain trays needed	ditto plus vacuum gauges	Car-sized work area
3	Straightforward, but follow the instructions	Oil / dirt up to elbows	Messy and untidy	ditto plus full socket and ring spanners, car type jack	Garage or covered area recommended
3a	Engine must be removed from frame	ditto	ditto	ditto	ditto
4	Complex or delicate inside-engine work	Boiler suit / overalls recommended	Significant mess in the working area	Top-level home toolset and equipment	Double garage needed
5	Major surgery	Throw your clothes away afterwards!	Major disruption in the working area	Dealer level facilities	Dealer level facilities

Notes - from 30 years of spannering experience:-

These days I tend to ***use surgical rubber gloves*** when wielding spanners. They make a very significant difference to keeping your hands clean. However as soon as a glove is torn, discard it, or you might inadvertantly drop a rubber fragment, and block a water passageway or oil jet.

Never be afraid to ask a more experienced rider / mechanic for help. This will probably only cost you beer or coffee. Most good home mechanics are happy to be asked to help out.

A ***second opinion*** on a problem is always valuable.

If removing a petrol tank, ***do not place it at your only means of escape*** from a working area. In the event of a fire, you will be trapped. Don't ask me how I know.

A ***torque wrench*** is mandatory equipment.

Clean lint-free rags, an old expendable towel, are extremely useful items to have around.

Keep ***small children away*** from working areas. You'd be amazed what they poke down spark plug holes or open cylinder head spaces. I once recovered a Stickle Brick from a radiator hose.

After an engine rebuild, have a ***work break before starting the engine***. On returning, refreshed and renewed, you may spot something vital that you missed before.

Use your old towel to cover exposed engines or electrics, if you are interrupted. This prevents foreign objects falling in. I've seen bird droppings fall into an open engine.

Label all unfamiliar removed components. Most engine parts are left or right handed and are not interchangeable. Generally, when working on paired components, deal with one side at a time.

If you are in doubt about a procedure, ***itemise*** it as you go along, dictate into a tape recorder or photograph the work.

Brush clean and grease engine to frame, axles, and other holding bolts before reassembly. This ensure that next time they will come out cleanly.

Most mechanicky jobs take ***twice as long*** as you thought they would.

An involved job is best done in ***stages of 3 to 4 hours***. If you try and blitz a long job, you tend to get fed up and that's when you cut corners and make silly mistakes. Take work breaks and think about what you will do next, play the work through in your mind.

CX500 / GL 500 / CX650 / GL650

Tappets (Valve Clearances) and Cam Chain Adjustment; clean / reset Sparking Plugs

Skill levels explained.

Skill Level : 2. **Dirty Level** : 1. **Mess Level** : 1. **Tools level :** 1 : 10mm, 12mm ring and socket spanners; ratchet and extension bar; torque wrench; feeler gauges; spark plug removal wrench; slim nosed pliers; wire brush; a hand lamp may also help. **Space required** : 1

Time : *expert* 15 minutes, *average* 20 minutes, *"first-time"* 40 minutes.

All the hands, tools, and bike in the photos are the author's.

All nut and bolt sizes are given as the spanner size required to fit them.

I am very receptive to comments and suggestions, but you use these pages entirely at your own risk.

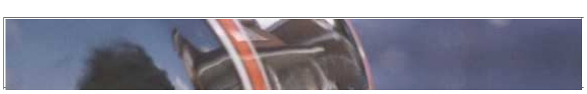
This page will show you how to check and adjust the valve clearances (tappets) and the manual cam chain adjustment on your Honda CX500, and variants, engine. If you own a "Eurosport" CX500E-C, GL500, or *any* of the 650cc or Turbo models, your cam chain tensioner is fully automatic, and you don't have to routinely do anything to it.

The CX engine's cylinder heads project well clear of the petrol tank and main spar and consequently there is nothing to dampen or mask the sound of clicking or clacking tappets. This makes the CX rider extremely aware of when things are in need of adjustment, especially when filtering past stationary traffic and the engine sound is reflected back from the sides of adjacent vehicles.

Tappet and cam chain adjustment is simple and can be done whenever desired; Honda recommend that the procedure is carried out as a matter of routine **every 7,200 miles (12,000 km) for UK 500s, UK 650s, and all US models up to 1981**; and **every 8,000 miles (12,800 km) for other models**. In practice I have found it necessary to adjust the tappets very much more frequently than that, even as often as every 1,000 miles, or the rattle becomes annoying, especially as the bike inexorably ages. However the "normal" tappet rattle doesn't do any harm, but a pronounced clattering should be dealt with immediately. You can even do this by the side of the road, if your travelling toolkit is up to it, and you allow your engine to cool.

Procedure

Note that the ***engine should be absolutely stone cold***; best left overnight in fact. Some Honda engines have the cam chains adjusted whilst the engine is running, but the CX does not. Place the bike on its centre stand on a firm surface and turn off the ignition. As you will be dealing with petrol, don't smoke or use any naked flame during this procedure.

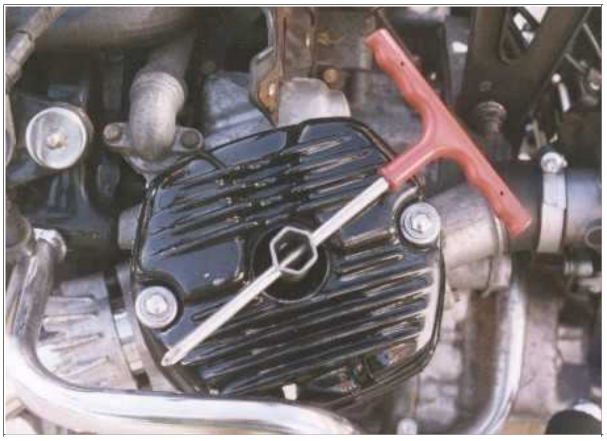


Turn off the fuel supply and disconnect the fuel pipe from the petrol tank (left) to the LH carburettor. My bike

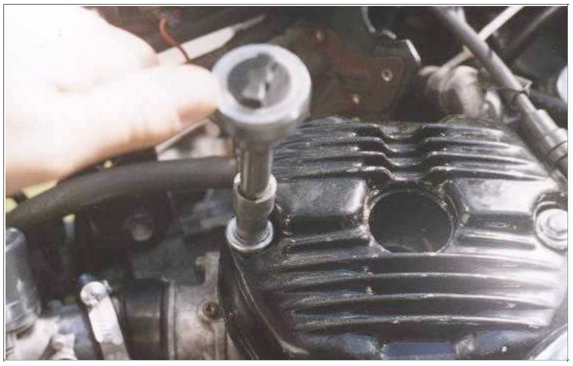
has a manual fuel tap with only one pipe, but variants with a vacuum operated tap will have two pipes. Remove the saddle. My bike has two spring loaded catches at each underside of the rearmost part of the saddle; other models may be different, and require the saddle to be unbolted.

Remove the 12mm head bolt securing the petrol tank (*right*), and lift off the tank. Some variants have the tank bolted at two points right at the front. Place the tank outside and away from any potential source of heat, flame or electrical spark. Particularly, if you are working in a shed or garage, do not place it at your only means of exit. If there is a fire, you won't be able to escape. I was once trapped in this way and ended up with very nasty burns to one leg.

Pull off both long sparking plug caps from the plugs, then remove both plugs (*right*), putting them safely aside if you plan to reuse them. Note that the plugs are unusually deeply recessed and a long reach plug spanner will be needed to get to them.



The chromed curvy bar at the bottom left of the picture is part of the engine protectors. You can also see the chrome water transfer pipe (*bottom right*) which feeds water between the water pump at the rear top of the engine, and the radiator right at the front. The aluminium L-shaped section at 11 o'clock in the picture is the water transfer pipe between the left cylinder jacketing and the thermostat. It's a good idea to give these parts a good visual check for leaks, whilst you are there, and to brush out any dust or dirt from the crankcase area underneath the petrol tank.



Remove the two 10mm chromed securing bolts (*left*) and then the RH cylinder head rocker box cover. My bike has had these covers sprayed black. The rocker box covers may need a firm tap with a rubber hammer to dislodge them. Repeat with LH cover. Notice the exposed mechanism; rocker arms and valve springs.

Don't drop anything down any of the exposed works. If you have small children, keep them away. If you are disturbed during the procedure, spread a rag or old towel over the exposed engine to stop foreign object damage - maybe bird droppings - I've seen this happen.

Cylinder head bolts - check

Whilst the cylinder heads are exposed, you should check that the big 14mm head black bolts are correctly tightened. Here are the settings. Check these before you adjust the tappets as if the head bolts need tightening, this affects the valve clearances.

All 500cc except GL inc Turbo	36 - 40 lb / ft	5 - 5.6 kg / m
All 650cc and GL500	36 - 43 lb / ft	5 - 6 kg / m

UNDER NO CIRCUMSTANCES DO THIS "BY FEEL" as a stripped thread will mean removing the cylinder head and having expensive and time consuming repairs done. *Always use your torque wrench.*

Onwards ...

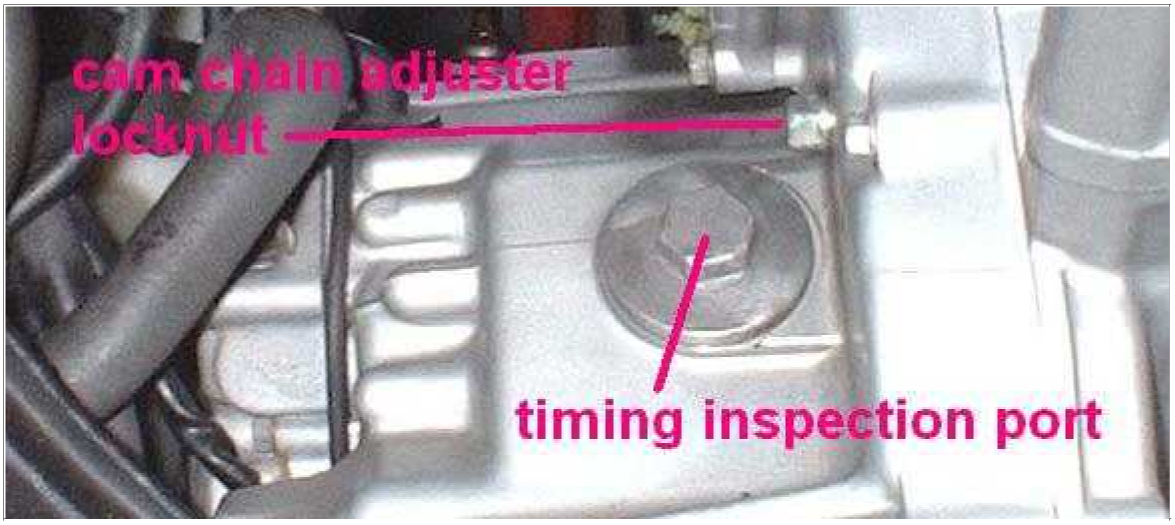


Photo (left) shows the rear right crankcase, the timing inspection port with the 17mm round cover, and the manually adjusted cam chain tensioner locknut.

Thanks to ***Neil Babcock*** for the very clear photo.

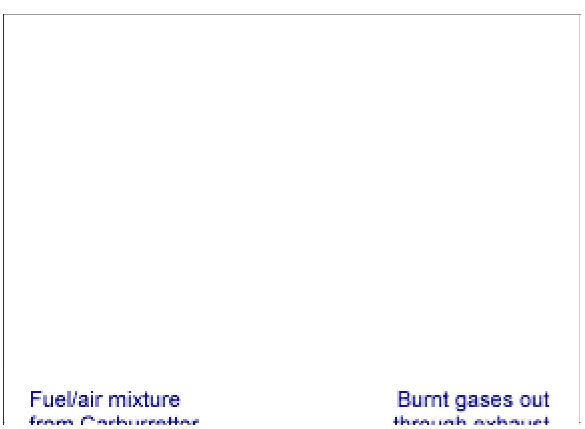
If you have a manual cam chain tensioner, you will see a 10mm head bolt protruding from the rear of thecrankcase, and just below this, a 17mm head round inspection port cover (*right*).

Newermodels have a rubber tube from the port cover leading to the air cleaner box directly behind; if so, pull the tube off first. You will probably need an adjustable wrench to remove the port cover, as the nut size is about 23mm I think. The older models have the plain 17mm port like the photo opposite.

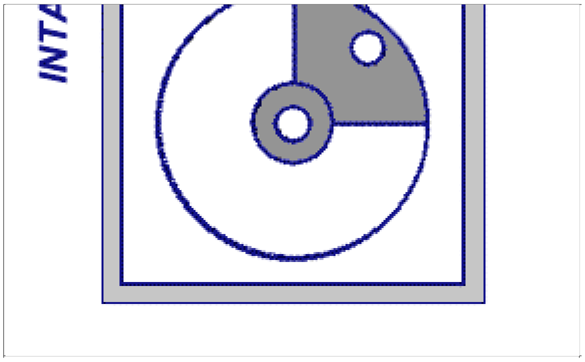
Remove the round cover, but do not do anything yet with the tensioning bolt. If you can't see a tensioning bolt, you have an automatic cam chain tensioner, and your task will be somewhat easier.

Wiggle the rear wheel and put the gearbox into top gear (left).

Sit down close to the inspection port and peer into the crankcase aperture. If you can't see in, a small lamp will help. You will see a circular flywheel with a smaller dull metal circumference and a larger polished steel circumference. Now reach back to the top of the rear tyre (*right*) and firmly rotate the wheel clockwise (or forward from the top). You will see the engine flywheel being turned "upwards". Viewed from the front, this would be turning clockwise.



Your engine completes four strokes (left) for each complete cycle; intake with the piston descending and sucking in the fuel / air mixture, compression with the piston ascending and squeezing the mixture, combustion with the piston being driven down by the force of the explosion; and exhaust with the piston ascending again and driving out the burned mixture. Thus, at two stages in its cycle, the piston will be at its uppermost limit of travel. This is called ***top dead***



centre, popularly called ***TDC***. The four stroke cycle is often called suck - squeeze - bang - blow.

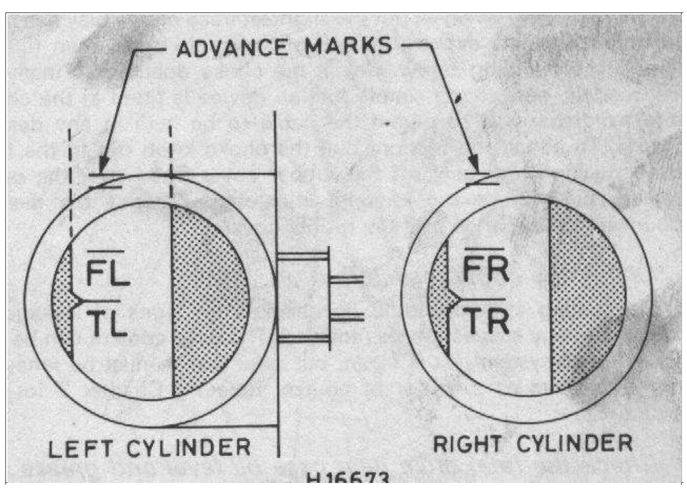
Stroke	Inlet valves	Exhaust Valves	Piston is
Intake	Open	Closed	Descending
Compression	Closed	Closed	Ascending
Combustion	Closed	Closed	Descending
Exhaust	Closed	Open	Ascending

Valve clearances for each cylinder are done with the engine set to TDC on the compression stroke, and the inlet valves closed. The trouble is, the part of the crankshaft you can see will be in exactly the same position at TDC for both the compression and the exhaust stroke, and you can't tell by just looking at it which stroke it is on.

As you nudge the roadwheel clockwise, watch the four exposed rocker arms on the RH cylinder head, right in front of your nose. There are two pairs - inlet, nearest you; and exhaust, furthest away from you. The nearest pair are the ones to watch, as when they have just finished closing (rising up as you look at them) the engine is at TDC on the compression stroke.

To get this exactly correct, gradually nudge the road wheel clockwise and peer at the flywheel. Scored into it are deep marks which tell you when the piston is at TDC. You will see first of all a pair of unmarked lines come into view; then a mark with **FR**, then a mark with **TR**.

I did photograph this view of the engine but it didn't come out, so here is a drawing (right) of what it looks like. Note that the calibration mark is the grey-shaded pointer on the left of the aperture, and the FL/FR and TL/TR marks are on the dull part of the flywheel.



Ignore the FL and TL marks for the moment.

Nudge the roadwheel forwards and watch the inlet valves nearest you. When you see them rising, the piston is coming up on the compression stroke; continue to nudge the roadwheel gently until you see the **TR** mark align precisely with the calibration pointer. If you are on the compression stroke, you will be able to rattle both the inlet and exhaust rockers on the RH cylinder head.

There should be a small but feelable up-and-down movement (*left*), and an audible clack. If you have the piston on TDC of the exhaust stroke, there is no free movement of the inlet valves, they are locked up solid, and you need to turn the roadwheel enough to nudge the engine round another complete turn to the TR mark again.

One good dodge here is to take a T-handled screwdriver (*right*) and slide it into the hole where the spark plug was. Whatever you do, don't use anything that could disappear completely down the hole or you will have very major problems. A T-driver can't fall right in. As you turn the engine, the T-driver is moved up and down by the piston as it rises and falls, and it's consequently dead easy to see where it is in its cycle of travel, as you can see it and feel it.

Ok, you've got the RH cylinder at TDC on the compression stroke. Setting the tappets or valve clearances means checking and possibly adjusting the tiny amount of free space between the top of the valves themselves, and the rocker arms (the mechanism which actuates them). As the engine gets very hot and its metal expands, this clearance ensures that the whole thing works correctly. It is measured in thousands of an inch ("thou") or tenths of a millimetre, and varies according to which model of bike you have, as per the following chart.

Valve clearances (engine cold)

Model	INLET	EXHAUST

CX500Z, A, B, C, all CX650 variants	0.1 mm / 0.004" / 4 thou	0.12 mm / 0.005" / 5 thou
All other 500cc variants (Eurosport, GL500)	0.08 mm / 0.003" / 3 thou	0.1 mm / 0.004" / 4 thou

Your feeler gauges (*left*) are a set of slim steel tongues which are precisely machined to a certain thickness, which is etched or stamped on them. For my bike's inlet clearances, I will be using the gauge which has the thickness of 4/1000ths of an inch, or "4 thou" or 0.004". If you work in millimetres, the gauge is marked 0.1mm, i.e. 1/10th of a millimetre. For the exhaust clearances, I will be using the gauge of 5/1000ths, "5 thou", 0.005", or 0.12mm. Your bike may be different - check with the above chart. Even if the clearances are different, the technique of checking and adjusting is exactly the same.

Some feeler gauges do not have a single tongue for the required thickness. It's fine to slide two or more tongues together to build up to the necessary thickness. For example, if you don't have a *5* thou gauge, you can use a *3* thou and a *2* thou slid ***together*** to add up to *5* thou. This is quite ok, but be careful that no other gauges have accidentally slipped in between the ones you want.

Some time after these original photos were taken, I bought the special Honda tool for adjusting CX tappet screws - it's pictured (left) and is part no ***07708-0030400***. If your dealer can't find this part, try the alternative part number ***07908-KE90200.***

It's a handy mushroom-shaped tool with a knurled handle, 1½" tall and with the exact size square hole for getting those clearances spot on. Recommended, and only about £3.

Slide the gauge between the top of the valve stem and the bottom of the adjuster on the rocker arm (*right*). It should be a close, snug fit, but should just be able to slide in and out. If it won't go in at all, or rattles about too freely, the clearance needs adjusting. Leave the feeler gauge in place, and use a 10mm ring spanner to slacken the locking nut and

a pair of slim nosed pliers to grip and turn the adjusting screw gently.

Useful Tip! After much experience with this class of engine, I have found that the tappets will start to rattle somewhere about the 1,000 mile mark after adjustment. This is an annoying thing to happen, and now I set the clearances to very tight - so I can ***just*** withdraw (drag!) the feeler gauge out afterwards.

Tweak the adjusting screw (*left*) whilst you slide the feeler gauge in the free space, until the gauge can only just move, but is not trapped so tight that you can't extract it. Now whilst you use pliers to hold the adjuster still, tighten the locknut a little more than finger tight. Remove the ring spanner.

Now check the clearance again. If it's still ok, use your torque wrench to tighten the locking nut to the correct setting of 11 - 13 ft lbs (500cc engines) or 14 - 18 ft lbs (650cc engines). Check the clearance again, and readjust if necessary. Don't forget to use the torque wrench (*right*) to finally tighten the locknut.

(A rather unusual thing happened when I did the tappets on 15-Apr-03. Two of the adjusting screws, on the same cylinder head, stripped, despite using the correct torque. Luckily I had spares. I now recommend not tightening them more than just above the lowest setting.)

This is all a little fiddly, and sometimes you will wish that you had three hands - one to hold the feeler gauges, one to hold the pliers and one to hold the spanner! But it ensures that your valve clearances are spot on, and this staves off the dreaded tappet rattle for longer than usual. It's all mostly a question of practice.

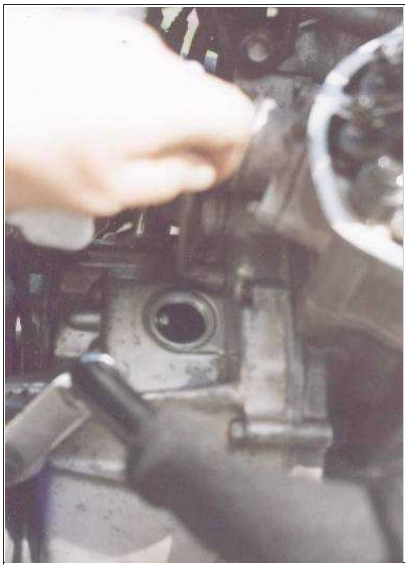
Repeat, checking the clearance on the other inlet valve.

Now select the other feeler gauge and check / adjust the slightly wider exhaust valves. These have wider settings because they have very hot exhaust gases rushing past them, whereas the inlet valves are cooled by incoming unburned fuel / air mixture, and consequently they don't get so hot.

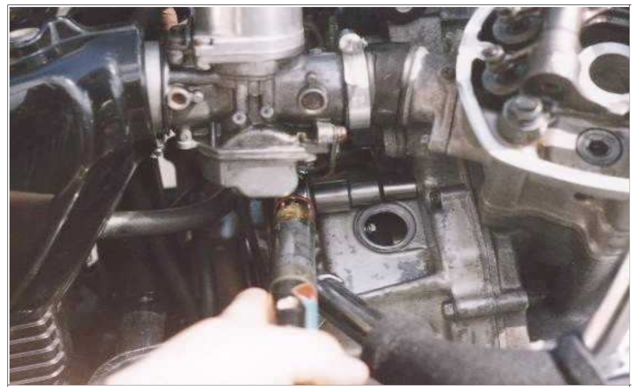
That's dealt with the RH cylinder and the LH one now needs the same procedure. Go back to the inspection port, and this time nudge the rear wheel **backwards, from the top of the tyre** (as if you were reversing the bike) as you peer in through the hole. When the **TL** line (**not** the FL line) is against the calibration mark, the left piston is as TDC. Check that the LH tappet arms are free and "clackable". If you find they are locked up, nudge the engine round 360 degrees until the **TL** mark comes up again, and recheck for free movement of the valve mechanism. Check and adjust the clearances in just the same way as for the RH cylinder head, remembering that the inlet and exhaust clearances are different.

When adjusting the left hand valve clearances, the action of tightening the locknuts does tend to loosen the adjusting screws very slightly. To avoid this, screw in the adjusters so that the feeler gauges are just about slideable through the gap. Then check them after torqueing the locknuts.

Don't turn the rear wheel or engine just yet.



If you have a manual cam chain adjuster, use a 10mm ring spanner to undo the locknut 2 turns(*left*). Just in case the adjusting arm has stuck, give the tensioning bolt a firm tap (**not** a hefty great clout) and then set your torque wrench



to 6½ ft lbs and tighten the bolt (*right*). NEVER do this "by hand" as if you strip the thread on the tensioning bolt, this is an engine-out job to repair.

Replace the inspection port cover, finger tight plus 1/16 of a turn.

Insert one of the sparking plugs into the special spanner you used to extract it, and examine it (*right*). The colour of the plug gives a good indication of whether or not the fuel / air mixture is correct. If the plug is a light or golden brown colour, this is fine. A sooty, oily or obviously burned plug indicates a problem.

If you are not fitting new plugs, give each old one a good going over with your wire brush and use your feeler gauges to set the plug gap (between the central core and the little arm that projects over it) as per the following chart. In fact always check the gap on new plugs - they probably aren't correct. If the gap needs adjusting, gently bend the outer curved-over electrode.

Now clean and gap-check the old plugs, and put them in the boxes your new ones came in. Then put the boxes in your travelling toolkit. Who knows when you may need a spare plug?

Sparking Plug Gap / Type

Model	Spark Plug Type and Gap
UK all 500cc variants	NGK **DR8ES-L** or ND X24ESR-U set to 0.6-0.7mm / 0.024 - 0.028" / 24 - 28 thou
US all 500cc variants (carbs with accelerator pump)	NGK **D8EA** or ND X24ES-U set to 0.6-0.7mm / 0.024 - 0.028" / 24 - 28 thou
All 650cc variants	NGK **DPR8EA-9** or ND X24EPR-U9 set to 0.8 - 0.9 mm / 0.032 - 0.035" / 32 - 35 thou

Check that the drain holes at the bottom of the spark plug recesses are not blocked, then replace the spark plugs in the cylinder heads; finger tight plus 1/8 of a turn with the spanner.

Check that the two (inner and outer) cylinder head cover black rubber gaskets are not damaged; ensure no debris or tools are left in the head spaces, clean the mating surfaces (*left*) and refit the covers, tightening the chromed bolts to 6½ ft / lbs.

UNDER NO CIRCUMSTANCES TIGHTEN THE 10mm CHROMED HOLDING BOLTS "BY FEEL" as the threads are very easily stripped. *Always use your torque wrench.*

The left and right head covers are interchangeable, but they only fit one way up, as there is a moulded valley for the spark plug leads, which you now snap back on.

Before you replace the fuel tank, remove the radiator cap (*right*) and if necessary top-up the coolant level with antifreeze or deionised water. When refilling or topping-up the radiator, use a 50/50 mixture of distilled or deionised water (battery water) and ***silicate-free antifreeze***, with its distinctive orange or pink colour. Silicate-free antifreeze is much better for the ceramic seal inside the water pump, and cooling system generally.

UK readers note that if you buy antifreeze from Halfords, it should be the more expensive "Advanced" formula, which does actually say silicate-free on the rear of the bottle.

Refit the cap and replace the fuel tank; connect the fuel pipe(s). Turn on the fuel, checking for leaks.

Put the gearbox back into neutral and start the engine in the usual way. A good method of identifying the source of any noises is to place a small socket, on an extension bar, against various places on the engine casings, and rest the other end of the bar just inside your ear. You'll hear every sound. Experience is the best guide, but regular whirrings are ok, anything heavily scraping, knocking or hammering needs investigation. A child's play-doctor stethoscope is equally as good for listening to engine noises.

Short road test and leaks check, and you're done. To check the oil level, remove the dipstick, wipe it clean and reinsert it ***without*** screwing it in. Remove it again and the level (*left*) should be between the lower and higher marks, anywhere in the criss-cross hatched area of the dipstick is fine. Top-up oil if necessary but do not exceed the higher of the two levels.

If you get an oil weep or minor oil leak from where the rocker box cover meets the cylinder head, or from the water drain hole half way down the outer face of the cylinder head, it is most likely to be a misplaced rubber gasket, probably the centre "ring" one. Stop the engine and remove the cylinder head cover. You can of course replace both the black rubber gaskets, but a temporary fix is to use non-permanent gasket sealing compound such as Hylomar, smeared on the mating surfaces. A leak here will send oil all over your upper boot and shins, as well as dropping hot oil on the exhaust collector box.

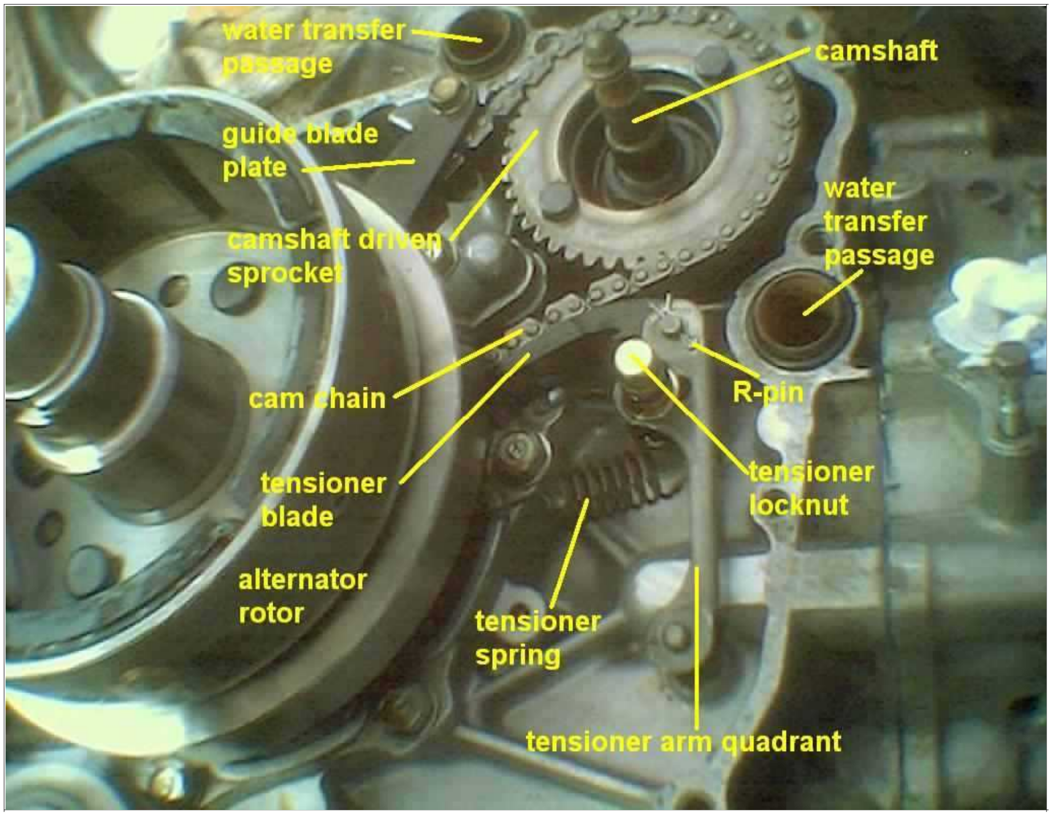
You are welcome to **comment** on these pages.

CX500Z/A/B/C/D Cam Chain and Manually Adjusted Tensioner

changing the cam chain and adjuster

500 Eurosports and all 650s have *automatic* cam chain tensioners which are different to these parts, although the camshaft, sprocket and actual chain are the same, or very similar. Auto tensioners are at the end of the page.

You can't see inside the rear engine casing - so what do all these bits look like?



The mounting plate shown here is the extended plate fitted from the A model onwards, and cures the early CX500 cam chain failures.

I didn't have all the bits to show you, I'm afraid - missing are the adjusting quadrant which is pulled down by the spring when the locknut is loosened.

As the quadrant is pulled down by the spring, the tensioner blade is bowed inwards against any slack which has developed as the cam chain wears and stretches. The tensioner blade is anchored at the bottom, and the top is attached to the quadrant.

The guide blade does not move. It is anchored at the top by one of the guide plate bolts, with its

bottom part resting in a slot cast into the crankcase.

Both blades are made from a very tough black nylon-like material which itself wears very little.

Cam tensioner failure occurs when the tensioner blade snaps at the upper or lower "neck". This leaves the cam chain free to rattle around, and it then chews it way through various portions of the crankcase. This is very noisy and if the chain breaks, the engine will probably be wrecked when the pistons hit the valves, bending the con rods and possibly even twisting the crankshaft.

Camshaft, with sprocket fitted and chain looped over. Farmost end drives the rev counter (tachometer) and on 500s, the cooling fan.

If you had SuperVision, this is what you could see from kneeling close to the rear left hand side of the engine!

Tensioner apparatus mounting plate. The ruler is in inches. This is the extended plate, which corrects the early trait of cam tensioner blade failure. The plate here is shown reversed - when bolted into place, its *other* face is towards you.

This plate has suffered abnormal wear, visible where the cam chain has rubbed a shiny line down the plate on the guide blade side. This was because the locknut thread was stripped when I bought the bike in April 2002, and the chain was

thrashing about a little. The tensioner blades were not damaged. I removed the engine and had the thread retapped, fitting all new cam chain and tensioner parts.

If you have a 1978 or 1979 original model CX500Z *(barrel shaped brake master cylinder, black tabs over Comstar spokes where they join the wheel rim, black radiator shroud)* and your plate lacks the upper extension, you should immediately fit the modified parts, which are available as a kit from Honda. The original modification was done free of charge but I don't know if Honda will still honour this!

Here are the punch marks adjacent to the engine number on the lower left crankcase, to show that the cam chain tensioner modifications were carried out. Even better, inspect inside the rear casing with a dental mirror and a lamp, to make sure that the long plate has been fitted.

(Thanks to John for the clear photo.)

CX500As onwards are ok.

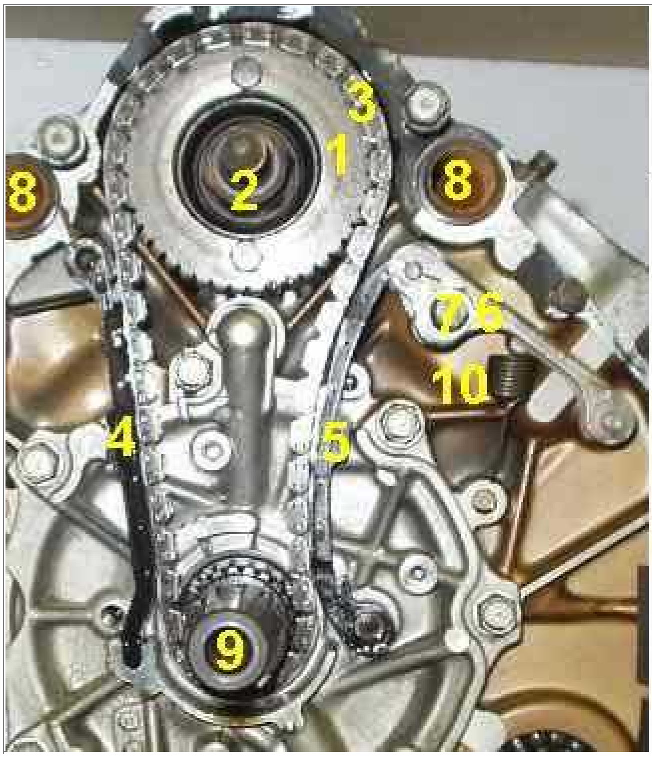
This photo shows the parts, as much as they lie inside the engine, shown against the inch calibrated ruler.

The "SuperVision" view would be from by the clutch cover.

Note that in this picture the spring is upside down - whoops, sorry!

Thanks to Maurice McAllen for the following photo set, showing the cam chain assembly before removing the guide plate (right) and afterwards (below) with the various components listed and identified.

PARTS PICTURE When following the instructions on changing the cam chain, the numbers on the picture below refer to the items in the parts list.



1 - camshaft driven sprocket
2 - camshaft rear end
3 - cam chain
4 - guide blade
5 - tensioner blade
6 - tensioner quadrant arm
7 - tensioner locknut
8 - water transfer passages
9 - crankshaft rear end
10 - tensioner spring

I've ringed in yellow (right) the most likely places to find where a slack cam chain has chewed away portions of the aluminium engine.

Look inside the oil filter element for the tell-tale silver or copper flakes or debris. This is bad news, and indicates major problems, especially if the flakes recur after flushing the engine and replacing the oil filter.

Coppery flakes indicate terminal damage to the shell (big end) bearings. This usually means a new engine. Replacing the shells is simple enough once the engine is out, but removing every trace of metal contamination in the oilways is a most daunting and difficult task.

A "fine example" of what damage a slack cam chain can do (below). All the metal ground off by the slack chain has to go somewhere ... into the lubrication system ... and the crankshaft is directly below the wear line. See also the **Disaster Zone** page for more dreadful things to worry about.

The cause of the problem - a snapped cam chain tensioner blade

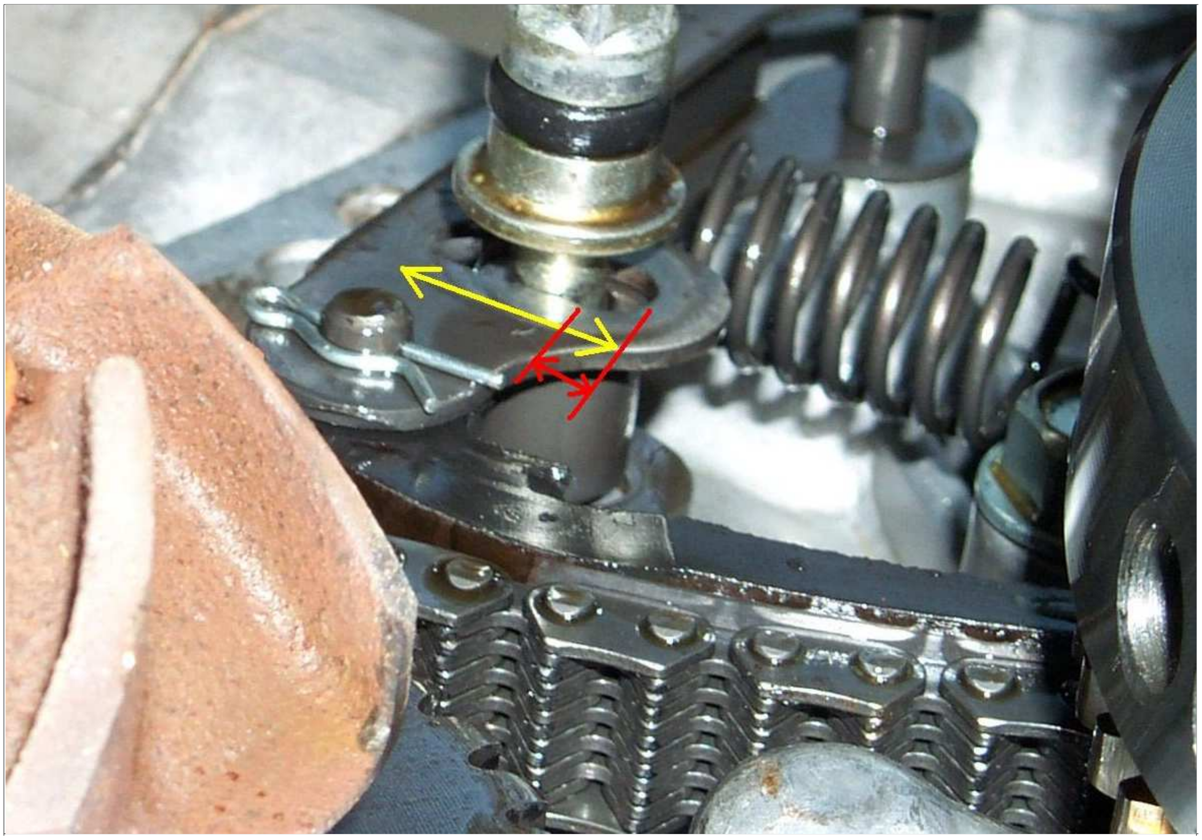
(right), with the classic "back of the neck" fracture.

The slack chain caused abrasive damage also to the mounting plate (left).

John Clarkson sent this very clear pic of a cam chain which wore out very suddenly, making the machine-gun noise. Here his screwdriver shows how much slack was thrashing about on the left hand run of the chain. This demonstrates how and why the metal parts get chewed away.

ALTERNATIVE PARTS PICTURE : Another view of the components (below).

1 - cam chain guide blade
2 - cam chain
3 - camshaft driven sprocket
4 - cam chain tensioner blade
5 - tensioner adjusting quadra
6 - tensioner spring
7 - locknut slot
8 - pivoting pin hole



Judging the wear on the cam chain and manual tensioner system

You judge by how much the cam chain is worn out by how far the manually adjusted tensioner arm has been pulled down by its spring. The more worn the chain is, more of the slot is visible BELOW the shoulder of the tensioner locknut ***once it's tightened down***. In these very clear pictures (thanks to Joe Robinson) the system is about half worn out,as you can see that the slot is about half way down its travel.

In the photo, ***once the locknut is tightened***, none or very little of the slot was visible. So in this example the cam chain is fine. Only replace any damaged parts.

The yellow line shows the tensioner arm's direction of travel and the red line shows where the wear is best measured, below the locknut's shoulder.

If the "red line" or "below" clearance is clearly more than the corresponding clearance ***above*** the locknut shoulder (when it's tightened down) or exceeds 1/10 of an inch, replace the chain, spinrg, o-ring on the locknut, tensioner and guide blades.

Automatic Tensioner

The automatic camchain tensioner is apparently rather less reliable and long-lasting than the manual type. I've heard that it can fail as early as 20,000 miles, compared to double that for the manual type.

The auto tensioner can crack its casing, as the photo (right) shows. Thanks to Sture Lindberg for the photo.

This automatic camchain tensioner has broken in a similar place.

The photo (right) shows an automatic tensioner unit which had done 34,000 miles and was completely worn out with a dreadful engine rattle noise. Well over 1 inch of the spring and plunger are visible, and we reckon we caught the engine just in time before serious damage occurred.

Thanks to ***Neil Goodall*** who sent these two comparison pictures of a worn cam chain (left) and new cam chain (right). Here you can see the difference in the extension of the spring loaded ***automatic*** tensioner. On the new one, the top lip of the tensioner blade is well to towards the tensioner unit and there is a visible lead-in to the blade. On the left, the worn-out blade is almost flat against the chain and the tip of the blade is level with the tensioner's guide.

<

Worn chain, old tensioner unit

New chain and new tensioner unit >

Changing the cam chain, tensioners and adjusting apparatus

You will need the following parts. Numbers refer to the big "PARTS PICTURE" higher up the page.

Use of a **torque wrench** is mandatory - serious or terminal engine damage can occur if bolts come undone, or threads strip out.

On CDI ignition variants (Z, A ,B ,C or D), check the **stator condition** BEFORE dropping the engine.

engine oil and filter, DO NOT buy cheap pattern oil filters

50/50 mix of nonsilicate **coolant** and battery (distilled) water

rear crankcase gasket (look on **Ebay** and buy 0.4mm to 0.8mm gasket roll and cut your own casing gaskets - it's easy!)

water pipe transfer o-rings (8) (again, **Ebay** will get you a box of 400+ assorted o-rings for about £10)

cam chain (3, or 2 on the alternative picture) - it's common to ALL variants including the Turbos. DO NOT buy the cheaper pattern cam chain

CX500 Z, A, B, C, D Models : manual tensioner arm (6, or 5 on the alternative picture); spring (10, or 6 on the alternative picture); tensioner locknut (7) and o-ring; tensioner blade (5, or 4 on the alternative picture); guide blade (4, or 1 on the alternative picture); you can re-use the r-pin and locking pin unless they have been damaged.

all others : automantic tensioner unit (picture immediately above), tensioner blade, guide blade.

Remove the engine and the **rear crankcase**, water pump etc and alternator rotor. Remember that if you are changing the cam chain it's sensible to change the **mechanical seal** at the same time.

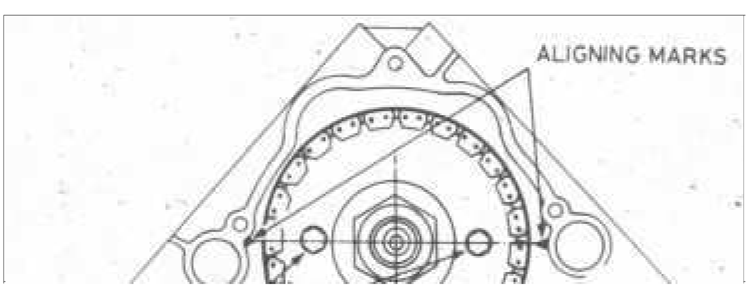
Remove all traces of the old rear crankcase gasket from both faces. Don't allow fragments to drop into the engine.

Unbolt the tensioner mounting plate - there are 4 x 10mm bolts holding it in place - then it just lifts away.

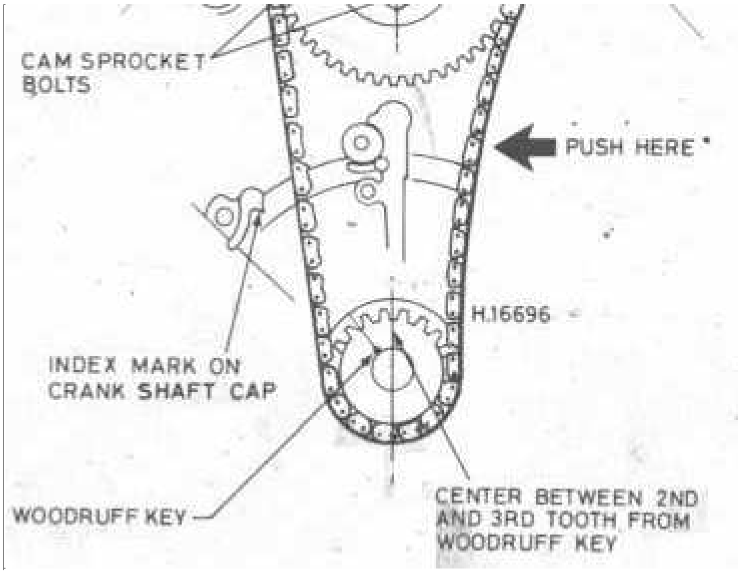
ZABCD : disengage the tensioner arm spring where it hooks over the mounting plate. Note which way round it goes - long leg downwards. Remove the tensioner locknut, r-pin and pull the tensioner blade away, it's not anchored at the bottom, it fits into a slot. Pull off the tensioner arm.

OTHERS : remove the 14mm bolt holding the auto tensioner unit and pull it away, it can be tight fit on the steel locating pin at the right hand end.

Remove the two short 10mm bolts which hold the camshaft driven sprocket (1 on the main picture) to the rear of the camshaft and slide the sprocket off the cam end. Unloop the old chain from the sprocket and from the bottom of its run where it engages with the crankshaft. Note the steel key embedded in the crankshaft end - this key is called a Woodruff key, and it not only secures the alternator rotor in the correct position on the crank, but also serves as an alignment mark during reassembly.



Loop the new chain over the crankshaft teeth and ensure that the Woodruff key is pointing the alignment mark. If you need to rotate the crankshaft and it's too stiff to move by hand, slip the alternator rotor on it and use that to move it.



Whilst pushing inwards on the right hand run of the chain, to simulate the tensioner pressure, jiggle the chain along the camshaft sprocket teeth until the bolt holes align with the corresponding marks adjacent to the water transfer pipes. This should leave the bolt holes exactly horizontal.

Attach the sprocket and fit the bolts finger tight.

NOW STOP WORK and have a coffee break for at least 10 minutes.

On return, check the timing marks again, and have another person check them against the diagram opposite. It DOES NOT MATTER which stroke the engine is on, I know this feels strange but take my word for it. Tighten the cam sprocket bolts to 11-14 ft lbs.

ZABCD : fit the guide blade on the left run (the flat face goes inwards), it's anchored at the bottom in a slot and at the top by one of the mounting plate holding bolts. Attach the tensioner blade (curved face inwards) to the left end of the tensioner arm and anchor it with the steel pin and r-clip (see pictures of how these locate).

Attach the spring, long leg downwards, to the retaining plate, hook it up to the tensioner arm with pliers and fit the tensioner arm onto its pivot pin, engaging the tensioner blade,s bottom hole on the steel pin close to the crankshaft teeth. Now allow the tensioner arm to be pulled down by the spring, pulling the tensioner blade inwards to take up slack in the new chain. Finally fit the locknut and its new o-ring, tighten to 6-9 ft lbs. If this bolt hole strips out, you can easily **repair** it.

OTHERS : fit the guide blade as above and the tensioner unit which pivots on the steel pin, it can be a tight fit. Anchor it with the 14mm black bolt and tighten that to 13-18 ft lbs. Fit the tensioner blade before pulling out the new auto tensioner's shiny steel securing pin, this allows the unit to extend and take up the chain slack.

ALL : Fit the retaining plate and tighten the holding bolts to 6-9 ft lbs.

Fit a new crankcase rear gasket - I use Hylomar on both faces to make a good join - and use new o-rings on the water transfer pipes.

After refitting the engine, set the **valve clearances**. **Change the oil** and filter after 500 miles.

You are welcome to **comment** on these pages.

CX500 / GL500 / CX650 / GL650 Oil & Oil Filter Change

NEVER USE PATTERN (i.e. non-HONDA) OIL or AIR FILTERS!

Will you risk your engine by saving a few £, $ or €?

Skill levels explained.

Skill Level : 1. **Dirty Level** : 2. **Work Mess Level** : 2. **Tools level :** 1 : 12mm, 17mm ring and socket spanners; ratchet and extension bar; **torque wrench**; plastic receptacle for the old oil. New oil filter (with large and small O rings), and replacement motorcycle oil. **Space required** : 1

All nut and bolt sizes are quoted as the spanner size required to fit them.

I strongly advise you NEVER to use ANY pattern (non-Honda) parts. The cost savings are minimal and the risks are huge. Are you going to risk trashing your engine for a couple of Pounds, Euros, or Dollars?

Time : *expert* 10 minutes, *average* 15 minutes, *"first-time"* 20 minutes.

All the hands, tools, and bike in the photos are the author's. In some of the photos I have had to wipe my hands clean before using the camera.

I am very receptive to comments and suggestions, but you use these pages entirely at your own risk.

This page will show you how to drain the engine oil, and remove and replace the oil filter. This is extremely simple and can be done whenever desired; Honda recommend that the procedure is carried out as a matter of routine **every 7,200 miles (12,000 km) for UK 500s, UK 650s, and all US models up to 1981**; and **every 8,000 miles (12,800 km) for other models**. However many riders routinely change the oil and filter every 3,000 miles, or at the beginning of the bike's summer use.

If you have one of the ***500 or 650 Turbos***, change the oil and filter every ***2,000*** miles.

Procedure

Don't do anything until you have bought the new oil filter and oil. Honda recommend "any good quality SAE 10W/40 engine oil, API class SE or SF". In the example illustrated, I used Halford's own brand of motor cycle oil; I also use bog standard 15-40 engine oil from my local supermarket, with no ill effects.

Standard, mineral oil is best in these engines. It's worth remembering that modern synthetic, part-synthetic or any oil with additives is likely to make the clutch slip. This is because the Honda clutches are designed to run 'wet', i.e. in general lubrication splash from the engine.

Oil Sump Capacities

Model	Imperial Pints	US Quarts	Litres
All 500cc variants	4.58	2.75	2.6
All 650cc variants	5.46	3.28	3.1

Take the bike for a short run, or allow it to idle for 10 minutes, to warm the engine to normal working temperature. This thins the oil and greatly helps the draining process.

Park the bike on its centre stand on a firm surface, turn off the fuel and ignition.

Remove the dipstick (*left*) to allow air in as the old oil drains out. Be careful where you put down the dipstick. If you stand on it and break it whilst walking round the bike, you won't be able to ride until you have bought a replacement.

Place the drain tray under the engine, just behind the front wheel. In the photos, I used a small blue storage bin. Use your 17mm ring spanner to loosen (turn anticlockwise when seen from the front) the engine oil drain bolt (*right*). Note that all 650s and both Turbos have the oil drain bolt in a slightly different place - it's under the engine casing and not as per the above photo, however the drain procedure is the same.

I recommend using a patch of old ladies' tights (or nylons) material to drain the oil through. This will immediately show up any engine debris. A few flecks of small "silver" aluminium particles are ok, but what you really don't want to find is large pieces of debris, and - horrible - any coppery or golden coloured flecks. The latter signifies serious engine problems, almost certainly a failing or failed big end bearing. If you get coppery or golden flakes, do not use the engine any more until you have investigated. Unfortunately, big end failure is usually fatal news for the engine, as repairs are prohibitively expensive.

Also look inside the oil filter body for any similar debris.

Be careful not to catch yourself on the hot exhaust header pipes.

As soon as the ring spanner has loosened the bolt, unscrew it by hand (*left*) and remove it. Don't let it fall into the hot oil or you will have to fish it out with a pair of pliers. Oil will start to drain as the bolt is just about to come out - careful - it's hot.

Allow a few minutes for all the hot oil to drain out (*right*). It's a good idea to have a cloth laid out handy (*left, below*) where you can put down tools and equipment.

When the oil has finished draining, use your 12mm or 17mm ring spanner (*right*) to loosen the oil filter central bolt. It may be easier to to use a socket spanner to actually unscrew the bolt, depending on how tight it is.

Once the central bolt is loose, unscrew the oil filter housing by hand or with a spanner (*left*), and remove it. Quite a lot of oil will flow out - don't worry - this is normal.

There is a large O-ring sealing between the oil filter housing and the crankcase. It doesn't matter if this falls off into the drain tub, because you won't be using it again.

Sorry about the weird angle on this photo (*right*)! Tip the oil from inside the filter housing into the drain tub. If the large O ring didn't fall into the oil tub, recover it from either its recess in the oil filter housing, or from where it stuck to the engine (*left, below*). If it's damaged, this doesn't matter as you won't need it again.

Slide out the oil filter bolt (*right*) and then remove the old filter; remove and discard the small black O ring at its throat, here seen between my thumb and middle finger. The old filter may need to be gently prised out.

Before you discard the old filter and its large O ring, have a good look inside the paper ribbed elements of the filter, for any debris. ***REMEMBER - If you find metal shavings, especially coppery flakes or large silver particles embedded in the filter, your engine has probably damaged its main crankshaft and / or big-end bearings, and is in imminent danger of complete failure. This should be investigated at once. It is almost certainly an engine-out job to correct, and the most likely solution is a replacement engine.***

A significant amount of silvery (aluminium) particles strongly suggests that your cam chain and tensioning apparatus is worn out. See this page for details.

Don't worry about the holes in the body of the oil filter bolt - these are supposed to be there.

Don't lose the spring and steel washer which go over the filter bolt and are located between the filter and the filter housing. These should slide or fall out as the filter bolt is removed from the housing.

Clean the drain bolt, spring and washer, filter housing area on the crankcase, filter housing (*left*), especially the recess where the new large O ring will be fitted.

Honda's standard oil filter bolt has a rather soft 12mm head, which is easily rounded off after many oil changes. I have obtained an aftermarket steel version which is much stronger and has a 17mm head. UK readers can obtain one mail order from **Motor Cycle Accessories**, 162, Belgrave Gate, Leicester LE1 3XL UK. Tel 0116-262-4983. The correct length one of 3.1" (78mm) length is likely to be discontinued, but the 3.5" (85mm) length version is easily cut down to the correct length (don't forget to thoroughly wash any saw-debris out of the bolt afterwards).

Note the difference between the new steel 17mm head bolt (*left*) and the Honda standard 12mm soft alloy version. During this particular oilchange, I fitted the 17mm bolt you see here, and it is clear that the old 12mm one is thoroughly worn out, almost completely rounded off. In fact to get it out, I had to use a Mole self-locking wrench applied to the bolt's outer circumference, and you can see the grip marks.

Whichever bolt you use, remember to fit the new small O ring around its throat (*right*). The O ring is black and slides into a recessed slot just below the bolt's shoulders. Push the bolt into the filter housing, from the outside inwards, and then slide in first the spring and then the washer over it. (The spring ensures that the filter is a snug fit against the crankcase.)

Left to right : oil filter, large O-ring, steel washer, spring, filter housing, oil filter bolt, small O-ring. Foreground left is the oil drain bolt.

I've edited the photo slightly to show the correct order of reassembly, the bolt actually goes into the housing dead straight, and not at the weird angle you see here. Nor is it as long as this picture suggests.

If your engine doesn't have the spring and washer, don't be tempted to continue without them. They ensure that the oil filter is pressed firmly against the front casing, and if you omit them, oil can bypass the filter.

If you imagine that the oil filter housing was transparent, this (right) is how the component parts go in, with the body of the housing between the bolt's shoulder and the bottom end of the spring. The red line shows where the housing would go.

Insert the bolt fully through the outside end of the housing; slide the spring, then the washer, then the new filter, along the bolt. The spring therefore sits against the oil filter bolt, and the washer against the filter element.

Now push in the new filter, taking care not to damage its own black rubber seals. It's best if you gently twist it down the length of the bolt. When seated correctly, with the O ring in place, it looks like the picture (left).

Before you fit the housing, smear some old engine oil (*right*) around the mating face of the oil filter housing, all round the O-ring. This helps it seal against the crankcase as you tighten the central bolt.

Set your torque wrench to between 13½ and 18 foot pounds (2 - 2.5 kg/m). Here I have set mine (*left*) to 16 ft lbs.

Offer up the oil filter assembly to its corresponding thread in the crankcase and turn it by hand as far as you can, at least enough to start the thread. Then use your torque wrench and socket spanner to tighten the bolt to the correct tension of 14 - 18 ft lbs (*right*).

DO NOT DO THIS "BY FEEL" as you may strip the thread or crack the front crankcase. Either of these problems means an expensive, time consuming repair.

ALWAYS USE A TORQUE WRENCH!

Then fit the drain bolt by hand to get it started before using your torque wrench again to tighten it correctly, also to 14 - 18 ft lbs (*left*).

Fill up the sump (*right*) with the specified amount of engine oil. Replace the dipstick and start the engine in the usual way. The oil pressure (red) warning light should go out almost immediately, certainly after no more than 5 seconds.

Let the engine idle gently for 30 seconds and then stop it. Now check the oil level; remove the dipstick (*left*), wipe it clean and reinsert it ***without*** screwing it in. The correct level is in the hatched criss-cross area, between the maximum and minimum low marks. You will almost certainly have to top it up, as the short engine run will have pumped oil around the drained oilways and passages inside the engine.

Then run the engine again and check / top up the oil level as necessary. Check for leaks at the drain bolt and oil filter bolt. Short road test, check for oil level and leaks again, and you're done. Dispose of the old oil in an environmentally friendly way; most Council tips have engine oil tanks into which your old oil can be deposited. (Mixed 50/50 with creosote, it makes a good weatherproofing compound for wooden sheds and fences!)

You are welcome to **comment** on these pages.

CX / GL 500 / 650 Clutch

If you have difficulty in engaging neutral whilst the engine is running, see the very end of this page, about clutch adjustments - BEFORE stripping the clutch!

This page shows you how to remove, strip, renovate and refit the clutch mechanism on your CX or GL. The clutches are generally very durable, and should not require any major work for at least 40,000 miles, although the operating cable is unlikely to last this long. Servicing the clutch assembly is easy, and does not require radiator or engine removal.

All nut and bolt sizes are given for the spanner size required to fit them.

I am very receptive to comments and suggestions, but you use these pages at your own risk. The clutch in the photos was from a 1980 CX500Z, but this is common to to the Z, A, B and C models. There may be very minor differences compared to the 500 Eurosport and 650 models.

Skill : 2. ***Personally dirty*** : 2. ***Work mess*** : 1. ***Space*** : 1. ***Time*** : 2-3 hours.

Skill levels explained.

Tools : 8mm, 10mm sockets, extension bar and ratchet; pliers; clutch nut removal tool (or strong screwdriver and rubber hammer); degreasing and cleaning agents (dishwasher ... !). Clutch cover gasket, Hylomar or soft sealing compound. **Torque wrench.**

How the clutch works

As you pull the handlebar clutch lever, this pressure is applied to the clutch cable which consists of a static outer sheath containing a moving inner cable. This method is usually known as a Bowden cable. The bottom end of the inner cable passes through a mounting point cast into the lower right of the front crankcase, and is attached to the clutch actuating arm. This passes through the clutch casing outer cover. As the cable is pulled, the arm moves upwards, forcing a cam out of the centre of the inside of the outer casing. The cam in turn forces out a mushroom-shaped thrust plate which pushes against a roller bearing embedded in the clutch retainer.

The clutch itself consists of an outer basket (left) which is driven directly from the nose of the crankshaft; thus it is turning whenever the engine is running. The outer basket has deep slots running up the sides of the basket.

The clutch inner basket (right) has gear-like slots on its outer circumference. In between the two baskets, to provide the friction which connects the crankshaft to the gearbox, are a series of circular ring plates, some with teeth on the inner face,

and some with teeth on the outer face, alternating. These plates engage alternately with the outer and inner baskets. The sets of plates are pressed tightly together by the four clutch springs, which are held in place on shaped projections of the retainer. The inner basket fits onto the gearbox input shaft, being retained by splines.

As the cable is pulled, the actuating arm rises, the cam is operated, the mushroom thruster projects and pushes down (physically, this is inwards, towards the engine) the inner basket, against the strong pressure of the clutch springs. This causes the clutch plates to separate just enough to allow the set which engage with the outer basket from moving round the set which engage with the inner basket.

So, the motion of the outer basket is not transmitted to the inner basket, and the engine turns without moving the gearbox.

Phew!

Clutch removal

With a cold engine, loosen by 4 or 5 turns, but do not remove, the 5 x 8mm head bolts which fasten the round clutch cover to the front right engine cover. Now pull the clutch handlebar lever in and the pressure down the cable should pop off the round cover. This saves you having to prise it off, and possibly damaging it. Neat one, huh?

With the cover loose, slacken right off the 2 x 10mm nuts which lock the bottom of the clutch cable to the casting on the front crankcase, and let the cable fully relax. Use your pliers to raise the actuating arm to the almost vertical position, and slide out the nipple at the bottom of the cable, releasing the cable. Slide the cable out of the cast-in supporting bracket, and push it out of the way. If the cable shows any sign of wear - probably at the nipple end - replace it with a new one. I don't recommend pattern parts, they never last as long as the genuine article.

Remove the 8mm bolts and pull off the round cover. The gasket is best renewed; clean all traces of it from both the round cover and the engine casing. Don't lose the mushroom-shaped thrust plate from the inner centre of the round cover.

Slacken, in sequence of about 4 complete turns on each, the four bolts which hold on the retaining plate. Note that the pressure from the clutch springs is quite substantial and by undoing then in sequence, you avoid stressing them. When the final bolt has been loosened and removed, remove the star-shaped spring holding plate and the four clutch springs. Don't lose the roller bearing from the centre of the star plate.

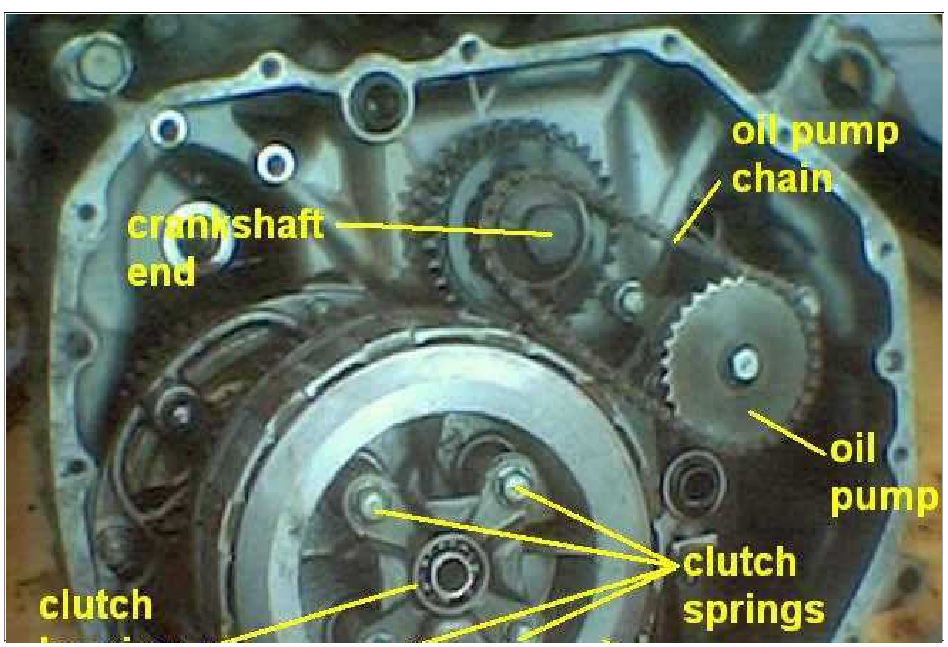


Photo (right) shows inside the front crankcase.

In the centre of the clutch mechanism is a round black steel nut (left) with four slots cut deeply into it. This is a very tight fit on its shaft and may be difficult to remove. Put the bike in top gear and get someone to apply the footbrake. Some mechanics cut a suitably sized spanner from a piece of pipe or an old socket, but most home mechanics simply apply a strong screwdriver to one of the slots in the black nut and hit the other end of the screwdriver with a hammer. This explains why almost all of these clutch retaining bolts show considerable battle damage, and if this the case, renew the nut.

Pull the entire clutch assembly forwards, disengaging it from the crankshaft.

Renovation

On the workbench, place the entire clutch basket so that the gear teeth are lowermost, and pull the inner basket upwards. It doesn't matter if the clutch plates come out with it or not; but withdraw and separate the plates and the two baskets. The bottom of the inner basket is the flat plate with the upwards-projecting pillars, over which the clutch springs were located.

The easiest way to clean all the bits is to wipe off all surface oil, and the wait until the wife is out before putting everything in the dishwasher. (Run the dishwasher on an empty cycle afterwards to clean out any residual oil.)

Whilst the dishwasher is running, you may want to polish up the clutch cover - see the page on Polishing The Aluminium.

With everything clean, examine the clutch plates. There are actually FIVE different sorts, and you need to identify them. First sort them into two piles, those with teeth on the inner and those with the teeth on the outer, circumference.

The "Type A" or inner-teeth set are easily identified because they are steel, and have tiny dimples on their surface. There are two types of

these. Only one is a double sandwich plate (left), and the rest (right) are not. Easy one.

There are five non-sandwich plates for the 500cc engines, and six for the 650cc engines.

In this photo (left) the two types of inner plate are shown side by side, for comparison. On the left is the single plate, on the right is the double "sandwich" plate.

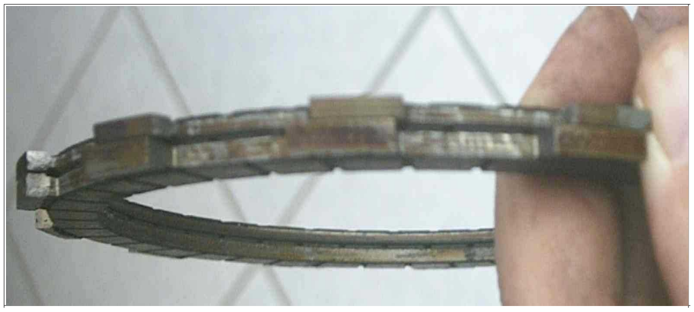
A close look at the bottom face of the photo shows the tiny dimples, just visible underneath my fingers.

The plates with teeth or lugs on their outer face are called "Type B" and come in three classes:-

There is one single "Type B" plate with score marks cut into the black friction material, running straight outwards, and has outer lugs noticeably wider than the other plates.

Here (left) the single thick tang "Type B" plate, held against the ordinary outer plate, and the wider tang is clearly seen. Put this plate to one side.

Secondly, there is another single outer plate which is visibly thicker (right) than its partners. Locate this plate and put it aside. In the photo, it's the lower of the two.



The remaining outer-toothed plates should be identical, and there are five for the 500cc engines, and six for the 650cc engines. These have score marks cut at a pronounced angle into the black friction material.

Wear limits

Measure the thickness of the plates and the length of the clutch springs.

Clutch spring minimum lengths : 500cc engines 1.2795" / 32.5mm; 650cc engines 1.4921" / 37.9mm

Clutch plate minimum thickness : Type A is 0.9896" / 3.5mm and Type B is 0.1221 / 3.1mm on all five plates for the 500 or all six plates for the 650)

Always replace the clutch plates as a complete set.

Reassembly

Insert the plates as follows, as per the photo (left):-

1. The Type B (outer) plate with the wider tang.

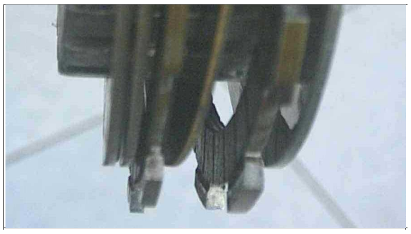
2. An inner Type A (steel) plate.

3. A Type B (outer) plate.

4. The double "sandwich" Type A steel plate.

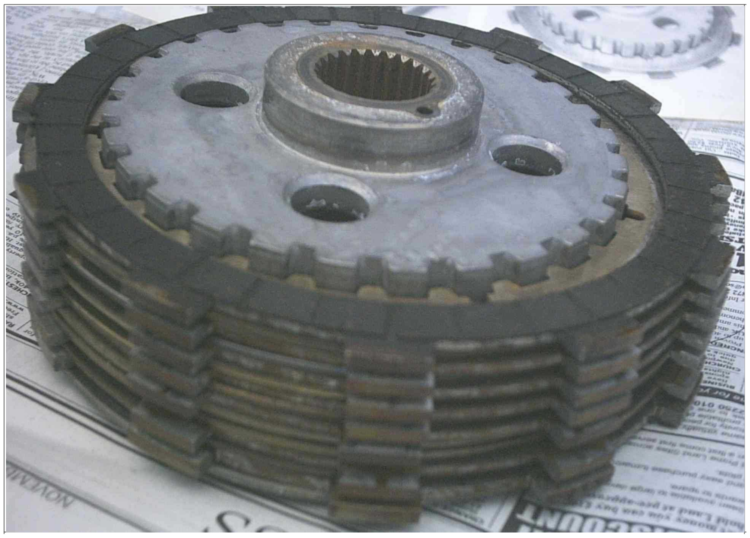
5. Alternating Outer Type B and Inner Type A steel plates (4 sets remaining out of the 5 for the 500cc, 5 sets out of the six for the 650cc).

6. Finally the thicker outer-toothed Type B plate.

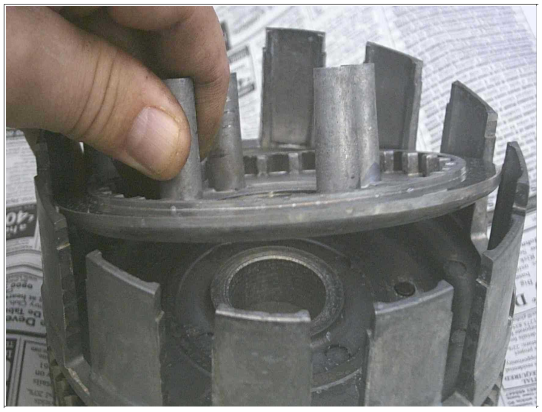


The photo (right) shows the clutch, after all the plates have been assembled onto the inner basket.

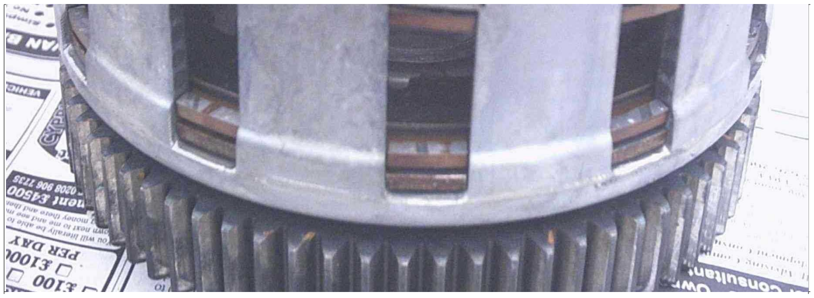
Line up the outer plate tangs so that they are all as straight as possible.



Either insert the retaining plate into the underside of the inner basket (left) or drop it into the outer basket (right).



Slide the inner basket into the outer basket and wriggle the plates down the slots. Don't worry if the inner basket disengages from the inner plates, but if this happens, you will have to wriggle the inner basket back down the plates again. This is dead easy to do.



This is what it looks like when it's all back together again. From this photo you can easily see why one of the Type B plates has the wider tangs - they are the only ones which engage in the correspondingly larger slots at the top of the outer basket.

Also, here you can see where the sandwich plate lies in the stack of other plates. I can't quite make out what the sandwich plate actually does ... I'm open to suggestions.

The big steel collar goes in here, and acts as a bearing. Note the oil feeder hole, make sure this is not obstructed with any dirt or debris.

If your renovated clutch is going into a spares box, spray everything liberally with WD40, rotating the inner basket inside the outer basket, to get the lubricant into every nook and cranny. Then spray every outer surface and wrap the assembly in newspaper and plastic bags.

Reassembly onto the engine

This is a straightforward reversal of the disassembly.

Taking care not to disturb the assembled clutch baskets, slide the clutch as a complete unit onto the gearbox input shaft, engaging the splines. Check that the gear teeth on the outer circumference of the outer basket have engaged with the primary drive pinion on the nose of the crankshaft. The inner basket should now still rotate independently of the outer basket, although it may be a little stiff to move.

Fit the steel washer over the centre of the clutch shaft; this washer (left) has the word "OUT SIDE" stamped on it, here just visible between my index and middle finger. The word should be facing outwards, i.e. towards the front wheel.

With the gearbox in top gear, and the rear brake firmly applied, fit the black retaining nut, this goes on with the chamfered side facing inwards towards the engine. Tighten to 58-72 ft lbs / 8-10 kgm. In practice it is difficult to get this right as some torque wrenches do not go above 50 ft lbs.

(To those of you without the right tools, do it up BLOODY TIGHT is all I can say. About 8 on the Grunt Scale when you hit it with your screwdriver and hammer.)

Slide each of the four clutch springs over its locating pillar and place the star-shaped retaining plate with its dished face inwards towards the clutch. Ensure that the small bearing in the dead centre of the star plate has not been lost or displaced. Fasten each bolt finger tight. At least one correspondent has had a bolt break off when tightened to the Honda recommendation of 10 ft lbs, and so have I, so I now recommend that you use a locking compound on the thread and tighten to no more than 8-9 ft lbs.

Check that operating the actuating arm is moving out the mushroom thrust piece, and using a new gasket and sealing compound, replace the round clutch cover, tightening the 6mm head bolts to no more than 6 ft lbs. These are VERY easily stripped, so be careful.

Reattach the clutch cable and test the action. Make major adjustments at the bottom end by slackening or tightening the two 10mm nuts which retain the cable against the casting lug. Contrary to popular belief and the Haynes Manual, one 10mm nut should be above the casting, and one below it, thus locking the cable in place. When correctly adjusted, there should be no more than 1/2" of free play measured at the ball end of the handlebar lever.

If you have difficulty in engaging neutral whilst the engine is running, make adjustments here BEFORE stripping the clutch! Also, many clutch problems are solved by simply fitting a new operating cable.

How to prolong clutch life

Clutch slip (engine accelerates but the bike doesn't) and **clutch drag** (difficulty in changing gear and selecting neutral; bike edges forward even with the clutch lever pulled right in) is best investigated and corrected as soon as it occurs. Begin by checking that the adjustments are correct, and that the inner cable slides freely up and down. Drip light oil - gun oil or sewing machine oil - down the cable, from the handlebar end. If in doubt, fit a new cable. I generally carry a spare clutch cable.

As you change down the gearbox to decelerate, give the engine a good blip of throttle. This gives you a much smoother ride, and saves no end of clutch wear, as the road speed will be better matched to the engine speed. Also, on a slippery surface, it really helps prevent a slide.

Pull the clutch lever in when you start the engine, even if you are in neutral. This means that the starter motor doesn't have to turn the clutch inner basket and gearbox as well as the crankshaft, and saves starter motor wear. This also holds good on your car, where this is a hallmark of a trained driver (as well as holding in the button of the handbrake, when you apply it!).

Whilst you CAN change gear without using the clutch, both up and down the gearbox, this is not recommended. It needs a great deal of practice, especially changing down, to get a seamless change, and prolonged clumsiness can only accelerate gearbox selector wear.

You are welcome to **comment** on these pages.

CX / GL 500 / 650 Compression Test

This page shows you how to do an engine compression test, which measures the amount of pressure inside the combustion chamber. This test is an indication of wear on the pistons, rings, bores and valves.

Skill : 1. ***Personally dirty*** : 1. ***Work mess*** : 0. ***Space*** : 1. ***Time*** : 15 minutes.

Skill levels explained.

All nut and bolt sizes are given for the spanner size required to fit them.

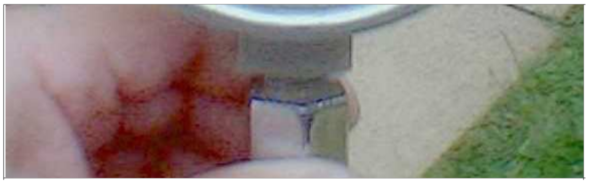
Tools : spark plug wrench and tommy bar; compression test meter.

I am very receptive to comments and suggestions, but you use these pages entirely at your own risk.

The compression test meter I used (left) was calibrated in pounds per square inch (psi). I'll give the recommended limits in both psi and kg/cm².

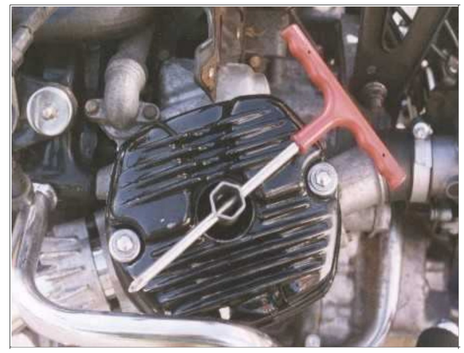
At the "engine" end it has a tapered hard rubber cone with a hole through the central axis (right).

At the other end is the dial (left). Make sure this is zeroed before you do each test. Some meters have a press-button which flicked the dial back to zero; this one just gradually subsides back to rest after you use it.



This test must be carried out with the tappets correctly adjusted and the engine at normal operating temperature; either take the bike for a 10 minute run or allow it to idle for 20 minutes, until the temperature gauge is vertical. The test is carried out on one cylinder at a time.

Stop the engine and remove the sparking plug (right); careful, it will be hot (as if you didn't know that).



Replace the plug in the plug cap, and earth the plug on some convenient metal place (left). This prevents damage to the ignition system. DON'T USE THE ROCKER BOX COVERS AS THESE ARE NOT PROPERLY EARTHED.

Move the engine kill switch to "off" (right).

Turn on the ignition and insert the engine end of the meter squarely and firmly into the spark plug hole. With the twistgrip at full throttle (right), spin the engine for 5 seconds. You may have to push down hard on the meter to keep it in the spark plug hole.

Read the pressure from the dial gauge of the meter and note the reading. Now zero the meter and repeat the test twice more, taking the average of the three readings. These should not vary much.

Photo (left) shows the gauge starting to read up the scale as the engine is turned over onthe starter motor.

Replace the spark plug and its cap, and repeat the test on the other cylinder.

Reading	all engines 500cc and 650cc
Range	171 psi +/- 28 psi (12 kg/cm² +/- 2 kg/cm²)
Minimum	143 psi (10 kg/cm²)
Maximum	199 psi (14 kg/cm²)

Readings below this suggest:-

1. Valves leaking (**decoke** and regrind).

2. Excessive piston ring wear.

3. Excessive piston/bore wear.

4. Blowing head gasket, although this usually manifests itself in more obvious ways, such as water / oil contamination, exhaust stains and leaks around the cylinder head, power loss.

To determine whether the compression loss is due to valve or piston/ring/bore wear, pour a teaspoonful of engine oil into each combustion chamber and repeat the test. If the compression rises, the wear is either rings, pistons, or bores; this requires major engine surgery as you can't get to the pistons or rings without almost completely stripping the engine.

If the compression stays as it was, it's valve wear, requiring a decoke. This is not a difficult job

By way of a temporary fix, buy some Redex or other upper cylinder lubricant and follow the manufacturers' instructions on how this can help the problem. It isn't a full fix, but it does help remove contamination from the combustion chamber.

You are welcome to **comment** on these pages.

CX/GL 500/650 Cylinder Head / Piston Crown Decoke

This site tells you how to remove the cylinder heads and valves from the engine of your CX/GL, and decoke (decarbonise) them. I am very receptive to comments and suggestions, but you use this information at your own risk.

All the tools, hands and the bike in the article belong to the author.

All nut and bolt sizes are given for the spanner size required to fit them.

Decoking one cylinder head can be done comfortably in an afternoon, although to do them both, you'd have to put in a very full day. I'd recommend taking it easy, and doing the job over a weekend, so you don't feel rushed.

What can go wrong? Unless you find some internal damage such as a burned or bent valve, there isn't much that can go wrong. Your most likely problem is losing one of the small valve collets, or maybe a spring, especially if one manages to "get away" during compression. Even one collet missing will render your cylinder head a useless pile of parts! I'd suggest using an expendable old cotton bedsheet over your work area and hopefully any parts that escape can be found quickly and easily.

During reassembly. you might have the frustration of a stripped engine hanger bolt hole. These can be **repaired** fairly easily. If you have dodgy bolt holes anyway, repair them at the same time as you do the decoke.

Decoking does not affect engine or valve timing, ignition or carburation. It would be sensible to **balance the carburettors** afterwards, as following a decoke, the engine should be running more efficiently.

Skill Levels explained.

Skill Level : 2. Personally dirty : 2. Work mess : 2. Tools : 1. Space : 1.

Tools : 8mm, 10mm, 14mm ring and socket spanners; feeler gauges; socket ratchet handle and extension arm; rubber mallet; torque wrench; wire brush; "top-end" gasket set; gasket sealant. Newspaper, kitchen roll, lint-free rags. Oil and filter after 500 miles. A pint or so of coolant.

I've recently taken to wearing thin surgical-type rubber gloves during maintenance. These don't last long - I was getting through two pairs a session, but they make a substantial difference to keeping your hands clean. The only warning I'd offer is that you should discard a glove as soon as it tears, as otherwise you might inadvertantly drop a small piece of torn rubber glove into the engine, and block an oilway or water passage.

Special tools : valve spring compressor, valve grinding stick and paste.

Don't attempt this work without a torque wrench as this tool is *mandatory* when reassembling the cylinder heads.

What is a decoke and why do I need to do it?

1. Accumulation of carbon desposits

As your engine ages, carbon from the burned petrol / air mixture very gradually accumulates on the piston crown, underside of the cylinder head, and on the valves, particularly the exhaust valves. (This is very like plaque building up on your teeth.) Eventually, after anything between 30,000 and 50,000 miles, the seal between the valve rims and the ports in the cylinder head start to degrade and leak, and you get backfiring and a general reduction in performance.

In a severe case, and if left uncorrected, the seal degrades so much that burned exhaust gases are forced past the seal, causing major (probably fatal) valve and cylinder head damage.

Using an upper cylinder lubricant such as Redex does stave off the inevitable accumulation of carbon and I recommend using it every fourth or fifth tankful.

2. Blown head gasket

The thick cylinder head gasket between the head and the barrel not only seals that joint, containing the force of the mixture exploding, it also ensures that the lubricating oil and the coolant do not leak between their passages, as they are pumped round the engine. If the cylinder head gasket blows, there is probably a leakage of these fluids into the inside of the engine, without external evidence. Also, engine oil may leak into the cooling system and cause blockages. The head gasket is therefore under considerable pressures.

The most common symptoms of a blown head gasket are:-

> ***white scum or froth*** on the oil surface, easily seen on the dipstick and indicating leakage of coolant into the lubrication system. This is the classic symptom;

> ***oil scum seen floating*** on the surface of the coolant, when the radiator cap is removed for checking the liquid level, and indicting a leakage of oil into the cooling system;

> ***both*** these symptoms;

> ***loss of oil and / or coolant*** with no apparent reason, no external leakage;

> ***reduction in performance*** as compression is lost between the cylinder head and barrel

> ***black exhaust stains*** between the cylinder head and barrel.

In both cases, decoking the heads and valves is a simple enough job requiring only one specialised tool apart from a valve grinding stick, which is a wooden pole about 8 inches long with a rubber sucker at each end, and costing only a few pounds from your tools dealer. You will also need a tube (like a toothpaste tube) of both coarse and fine valve grinding paste, again readily and cheaply obtained from any tools or spares shop.

The specialised tool required is a valve spring compressor, again a fairly standard purchase from a tool dealer. I use a very simple one like a carpenter's G-cramp. You cannot remove cylinder head valves without this tool.

You don't need to remove the engine from the frame.

In the photographs, you will see that Valiant's engine ***is*** removed, because it was out anyway for other work. But you will actually find it easier to do the decoke with your engine in place.

Park the bike on a secure surface and switch off the ignition. You don't need to disconnect the battery, but you can if you wish.

Remove the fuel tank as per the first section of **this** web page. Remove the saddle and side panels. One upturned side panel makes a useful place to keep stray nuts and bolts.

Remove the carburettors and inlet tracts as per this **web** page. Don't completely disconnect the carbs; just leave them on the end of the throttle cables, and swing them onto the top of the main spar. Beware petrol leakage at this point.

There is no need to drain the engine oil, but you should drain the coolant as per **this** web page. Have a new oil filter and new oil ready as you will need to do an **oil and filter change** 500 miles after the engine is rebuilt.

This procedure applies to each cylinder head in turn. Only work on one side at a time so there is no danger of intermixing the components.

On the right hand cylinder head, remove the two 10mm nuts and washers which bolt the exhaust manifold ring to the cylinder head. Slide the ring down the exhaust pipe. Where the other end of the exhaust pipe meets the exhaust collector box (commonly called the H-Box) under the engine, slacken the 12mm chrome clamp bolt and then wriggle the exhaust pipe clear. At the H-box end is a fragile asbestos sealing ring, take care not to lose or damage this. It may either come off with the exhaust pipe, or stay inside the H-Box.

If your bike has a Motad type 2:1 or one-piece aftermarket exhaust, you may have to remove the entire exhaust system. If you have standard 2:2 exhausts and silencers, you don't need to unbolt the silencers.

Now peer inside the sooty exhaust port, and dig out the squashed copper crush gasket. These can be hard to spot as they look as if they are part of the cast aluminium head. Scrape gently with the tip of a screwdriver and if you get copper shavings, dig deeper and drag out the flattened sealing ring. This will need replacing.

Remove the sparking plug caps and then the cylinder head (rocker box) covers (left) with the 10mm chromed bolts. Remove the sparking plugs. Note that Valiant's rocker box covers are sprayed black.

Remove the flywheel inspection port as per **this** web page, and rotate the crankshaft until all 4 valves are closed (both rocker arms can be moved fractionally by hand) with TR on the alignment mark.

Remove the two 10mm head bolts (right) which hold the rubber heat shield in place.

Remove the two 8mm head bolts (left) which attach the water transfer pipe, and dislodge the pipe. A minor coolant leak is likely at this point. Discard the O rings and clean up the mating surfaces of the pipe and its junction.

Pull off the thick rubber breather pipe, if fitted (CX500 and CX500A) to the right hand cylinder head.

Normally the engine hanger (or A-frame) is retained against the engine by 2 steel studs on each side of the engine. One end of the stud screws into the aluminium engine and there is a nut on the other end. Bikes with engine crash bars will probably have the longer 14mm head bolts as per the photo opposite.

If you have the bolts like the photo opposite, you need only remove the topmost engine hanger bolt (right) with the 14mm head. You may have to unbolt or loosen any engine crash protectors, and temporarily remove the radiator shroud, if there is not enough clearance to get the big bolt out.

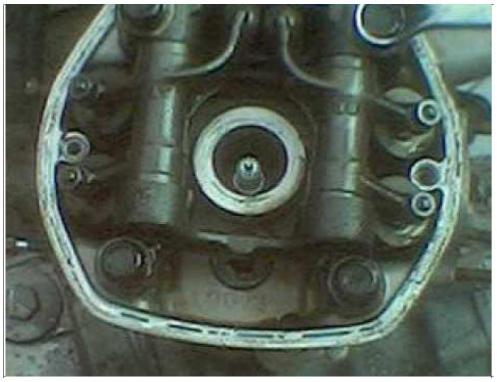
However if you have the long studs ... you have no option but to support the engine from underneath whilst you unbolt and remove the A-frame (or engine hanger) by unfastening the two long bolts at the top of the main spar, and then sliding the A-frame forwards, off the studs. Sometimes you can get a wrench on the ***unthreaded*** part of the stud and unscrew it, but usually these studs are corroded up and won't easily come out. Only when the hanger has gone far enough forward to clear all 4 studs, is there enough clearance to get the cylinder head off. So it's probably worth removing all 4 studs and sourcing 4 of the 14mm head bolts, as these are much easier to get out in the future.

You may have to drain the radiator and completely **remove** it, if there is not enough clearance on the studs.

If you are unfortunate enough to strip a thread, see this page on **thread repairs**. For the replacement bolts, try a local tool supplier or, a bike breaker.

At the lower front of the barrel is a 10mm short bolt which allows coolant in the cylinder jackets to drain. Remove this and replace it when the small amount of coolant has escaped.

Note the black 14mm black high tension cylinder head

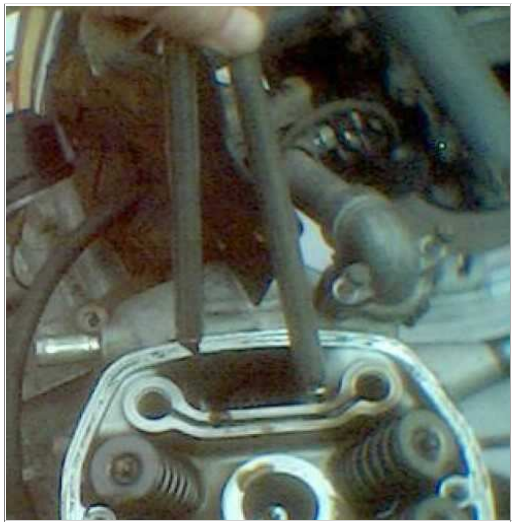


bolts (left) at each corner of the head. Loosen them a sixteenth of a turn in the sequence : top left > bottom right > top right > bottom left. Loosen them another half turn in the same sequence and continue to do this until they are free enough to be undone by hand.

The black bolts are surprisingly long (right). When they come free, there is usually a distinct popping sound as oil suction is broken, this is normal.

With all 4 black bolts removed, pull or gently prise off the rocker arm mechanism (left), this is in one piece. Don't lose the two large hollow locating dowels which fit between the rocker mechanism and the cylinder head.

Pull out the rocker arm pushrods (right). These only rest in place and are not attached in any way.



Some cylinder heads come straight off and some are extremely stubborn. Give the head some firm strokes with a rubber mallet, or with a wooden block between a hammer and the head, and work round all sides, giving sharp strokes to loosen the join.

I've found it best to use a large broad bladed screwdriver (left) at the place ringed (right), and gently tease the head off the barrel.

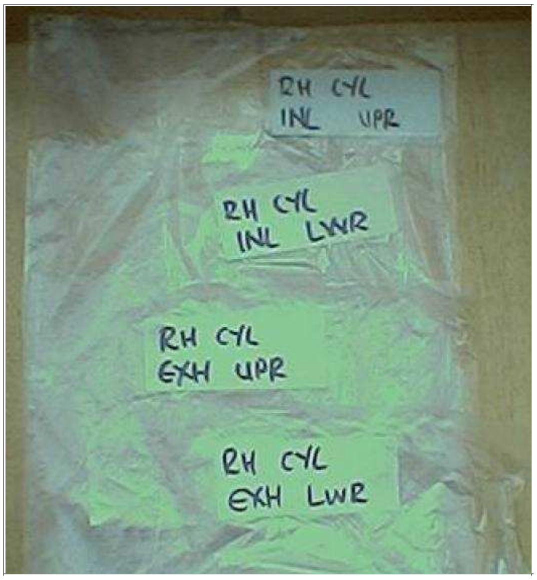
Don't force a blade between the two mating surfaces as they open, or you may well damage the faces. As soon as the gap opens, the head should pull off without problems. Don't worry about damaging the gasket, as you will be discarding it.

In the top rear corner of the mating surfaces on the barrel, you will see a small oil jet. Retrieve this and store it safely, discarding the (usually green) O-ring around it.

Plug the orifices in the exposed barrel with lint free rag, newspaper, or kitchen roll (left), to prevent foreign objects from falling in, and cover the exposed engine with an old towel, or cloth, whilst work is carried out on the removed cylinder head.

Note the carbonised piston crown. This will get cleaned up and polished later.

Place the upturned cylinder head on a workbench (right) and use a wire brush to clean off surface dirt and debris. It's worth making a thorough job of this, as it saves time later on. As dirt is removed, blow it clear of the head.
Particularly, use a soft scraper (I use an old thick feeler gauge) to scrape off all traces of any gasket or sealing compound.



As the valves and their component parts should not be intermixed, prepare 4 labelled clear plastic sandwich bags (left) ready to hold each set of valves as they are removed.

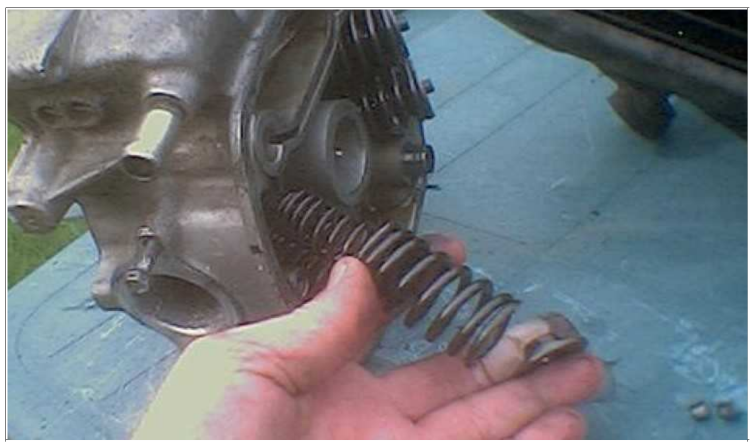
Each valve is inserted from the combustion chamber (underside, or piston area) and has a round steel base, an inner and outer spring, a steel collar and two half-moon-shaped collets. The collets slot into a groove in the top of the valve stem and are retained in place by the upwards pressure from the springs against the shaped collar. In order to remove the collets, a spring compressor is used to compress the springs, exposing the collets which then either fall out or are poked free.

Attach your valve spring compressor (left) to one valve, and compress its springs. I had a very mild day at the end of February 2003 and was able to work outside on the garden table - quite remarkable for February in Shropshire!

Don't get your fingers near the compressed mechanism, as if it slips off, you may get a bad injury to a fingertip.

When the pair of valve collets are exposed (left), use a thin bladed screwdriver to poke them off the top of the valve stem. Relax the compressor, and remove it.

Slide off the spring collar and then the inner and outer springs (right)

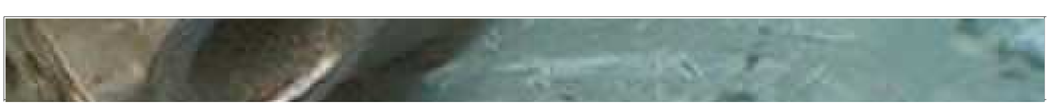


Push the valve stem (left) through

"downwards" and remove it. Pull off the valve seat. Store each set of valves in the labelled plastic bag, and tie the neck.

If the valve is twisted, bent or warped, or if it has a burned-away part, replace it.

Repeat with the other three valves. Photo



(right) shows the valve and spring assembly. Note that the valve's base ring hasn't been removed from the head yet, and isn't shown here.

Bag each set of valve components as you remove them, as they shouldn't be intermixed.

Pull off each valve stem seal (right) and discard it. These tend to go crumbly or hard, and disintegrate as soon as you grab them with a pair of pliers. Be sure to remove all accumulated debris.

Pull off each valve seating ring and store these safely. It is ok to intermix these.

The next step is somewhat tedious and is best done to your favourite video ... place the upturned head on a firm surface and use a soft scraper (again, a thick feeler gauge is ideal) to completely remove all accumulated black carbon deposits from the inside of the cylinder head and the 4 ports. A good deal of black dust and muck results, which should be regularly blown clear. After an hour or two of scraping, use a metal polish and a soft cloth to buff up the combustion chamber surfaces as brightly as possible. The shinier the metal, the less easy it is for carbon to begin accumulating all over again.

You can never get the metal looking new, but get it as clean and bright as you can. You can use a toothbrush to good effect to reach down into the exhaust ports, and run a cleaning rag to-and-fro to get the carbon out.

I used a Focus DIY electric variable-speed hand tool (left) with a buffing wheel to clean the cylinder heads and valves. Where carbon was particularly hard, I used an abrasive wheel ***VERY CAREFULLY AND GENTLY*** so as not to damage the actual metal. Focus DIY's tool is like a Dremel but 1/4 of the cost (£20 against £80), and it saved me hours of work, particularly on the polishing.

This is a good time to clean up the cylinder head external casing as well. Opinions differ widely on the best way to get a really good finish, but one cheap and easy, but time consuming way, is a fingertip of Solvol Autosol (or other aluminium-suitable metal polish) rubbed well in, and then buffed up with a soft cloth. It takes a long time, but it's worth the effort.

If you are lucky enough to have access to bead blasting equipment, the whole job is dead easy and done in a minute or two. However - be extremely careful to ensure that all traces of the bead blasting compound are flushed out afterwards. If any of this very abrasive compound gets into the oil system, your engine will be wrecked in no time at all (don't ask me how I know this ...).

Then take each valve in turn from its bag and clean and polish it in the same way, removing all traces of accumulated carbon from the stem and valve underside. Inlet valves in particlar seem to get a very hard dull white calcium-like deposit which can be hard work to scrape off.

Valve Grinding

Each cleaned-up valve in turn now has its mating face ground to exactly match the seating in the cylinder head. This ensures a perfect seal when the valve closes.

Take the first valve and lightly oil the stem. Smear a small amount of "coarse" valve grinding paste (left) over the sealing face of the valve and insert it into the correct port in the cylinder head. Take care not to make a mistake as the valves should not be intermixed.

Apply the valve grinding stick's rubber sucker to the valve's underside (right) and rolling the stick between the palms of your hands with a downwards pressure, firmly rotate the valve against the cylinder head. Lift the valve partially out again and turn it 90 degrees. Repeat this process, occasionally wiping the valve clean and applying further coarse paste, until the mating surface of both the valve and the cylinder head show a 1/10" or 2mm wide unbroken dull matt face.

Clean the valve and head of the coarse paste and apply "fine" valve grinding paste to the valve seat. Continue with this process until the mating surface between the valve and cylinder head is quite smooth continuous. Thoroughly clean away all traces of grinding paste and replace the valve's steel footplate over the valve guide. Press on a new valve seal and reinsert the valve.

With the close-coiled springs against the steel footplate, replace both inner and outer springs and then the retaining plate. Have the valve collets close to hand and use the valve spring compressor to compress the springs until the collets can be inserted and the spring compressor relaxed.

CAUTION! Sometimes the spring compressor slips off the valve spring retaining plate and the various parts will shoot off at very high speed. Don't get your eyes or fingers so positioned that an injury might result, and don't sit where a window might be broken by flying steel components!

To check that the collets are correctly seated after removing the compressor, give the valve stem a sharp knock with a hammer, along the downwards line of the valve stem. After the valve springs have rebounded, the collets should not have moved.

To test the integrity of the freshly ground-in mating faces, squirt in some WD40, or pour in a teaspoonsful of petrol or paraffin from the exhaust or inlet port, there should be no leakage past the valve seat into the combustion chamber area. If there is, remove the valve and regrind a little more, using fine paste.

Repeat this with the other three valves.

Nice clean and shiny cylinder head and valves, after reassembly

If repeated attempts to make a perfect seal are resulting in substantial grinding, the cylinder head should be either replaced, or entrusted to a specialist machine shop to have the seating face re-cut. In this case, new valves will be needed.

Use a similar technique to remove carbon from the tops of the exposed piston, and take care that debris does not fall into the engine. Polish the piston crowns to a good bright finish (right). Thoroughly remove all traces of the old head gasket.

Refitting the cylinder head

Double check that the head is quite clean and free of debris, lint, especially that all grinding paste has been removed. It is very abrasive and will damage the engine if allowed to contaminate the oil supply. Clean the mating surfaces of the barrels.

Have ready : a new head gasket with a the small O rings that sit over the oil feed jets between the barrels and the cylinder heads, plus some gasket sealant (I use Hylomar).

Fit the oil jet (left), indicated by the tip of the screwdriver..

Smear gasket sealant (right) over the mating surface of the barrel, and position the gasket. Fit the oil jet's O-ring and don't get any gasket sealant into the oil jet.

Smear gasket cement over the mating surface of the cylinder head and position it over the gasket, where it it located by two steel dowels (left). Push the head into place checking that the gasket is correctly placed.

Dab a spot of grease onto the end of each pushrod and slide them into their sockets inside the engine (right). It's worth double checking that these are firmly in place. Here, the right hand one is in place and you can see the socket for the left hand one. Note that in this picture, the head gasket is not present.

The "trough" is the oil feed passageway for the rocker mechanism. Don't obstruct this, as oil is pumped up the passage where the cylinder head bolts go, and the trough then shares it with the other side of the cylinder head.

Using a 17mm socket on the crankshaft nut on the front casing just above the clutch, rotate the crankshaft to bring the right cylinder to top dead centre (view TR through the timing aperture on the rear crankcase). Don't worry about whether this is TDC on the exhaust or inlet stroke ... you haven't fitted the cylinder head yet, so it doesn't matter.

Locate the rocker arm mechanism onto its two big dowels in the cylinder head, and ensure that the top ends of the pushrods are located in their corresponding sockets on the rocker mechanism (left). You may have to tap the rocker mechanism with a rubber mallet to get it to drop into place.

Insert the four long black cylinder head retaining bolts and screw them finger tight.

If you haven't got a **torque wrench**, stop working now and go and buy one. I know I'm paranoid about torque wrenches, but:-

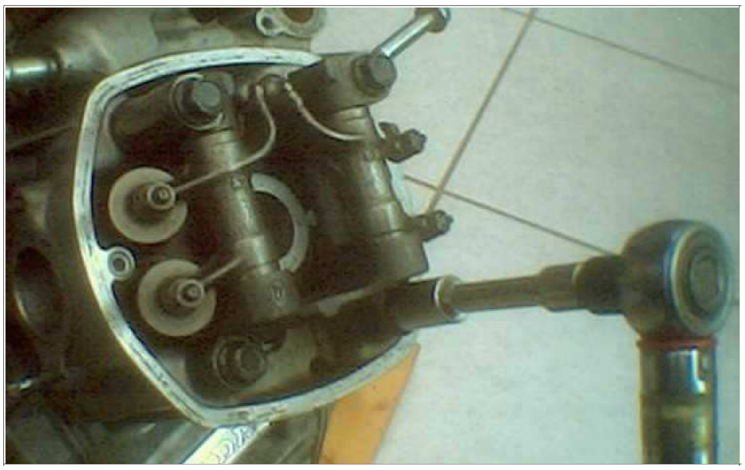
DON'T EVEN THINK ABOUT COMPLETING THE NEXT STEP WITHOUT USING A TORQUE WRENCH!

If you try and tighten the head bolts "by feel", you may well cause fatal damage to your engine. If you overtighten the bolts, the least inconvenient thing that can happen is that one shears off. If you are lucky, it will shear at the head and all that will be needed is to remove the cylinder head, extract *the broken-off bolt and replace it. If you are unlucky, it will shear flush with the top of the barrel and to extact this stub will take considerable effort and ingenuity. If this happens to you, well jolly well serve you right, try chiselling a slot in the top of the body of the bolt, taking great care not to damage the threads of the aluminium barrel, and then teasing the stub out with a screwdriver or slim chisel and rubber hammer. This will take several hours of slow, frustrating, patient effort.*

More likely is that the screw threads cut into the aluminium barrel will strip out. If this happens, you have no choice but to take the engine to a specialised engineering workshop and have the old hole drilled out to oversize, a plug inserted and the plug drilled and tapped back to the original size. If you are seriously unlucky, the barrel casting will break. This means a new crankcase and a full engine stripdown.

IT'S JUST NOT WORTH THE RISK - USE A TORQUE WRENCH!

In a diagonal sequence top right > bottom left > top left > bottom right, tighten the four head bolts in several stages:-



First to 15 ft/lbs, then to 25 ft/lbs.

Finally, **for all 500cc (except GL), tighten to 36 - 40 ft lbs**.

or

For **all 650cc and GL500, tighten to 36 - 43 ft lbs**.

Reconnect the water transfer passages from the thermostat area under the main spar. The two 8mm holding bolts should not be tightened more than 6 ft/lbs and use new O-rings. I also recommend a gasket sealant at each end of the short transfer pipes.

Replace the two 10mm head bolts holding the heat shield to the cylinder head, tighten not more than 9 ft/bs.

Use a new copper crush gasket inside exhaust port, between the cylinder head and the top of the exhaust downpipe. Refit the exhaust header downpipe and manifold ring, tightening the 10mm nuts to 6-9 ft/lbs and then the chrome H-box clamps to 9-14 ft lbs. If you damage the asbestos sealing ring, you can wrap a couple of layers of silver exhaust bandage or even kitchen foil around it before reassembly.

Repeat the entire replacement procedure with the other cylinder head, using "TL" as the timing mark for top dead centre.

I recommend tightening to the lowest maximum figure (36 ft/lbs in all cases) and then retightening to the midrange once the engine has been run and tested.

Reset the **valve clearances**, replace the rocker box covers and test the engine. Do not rev it hard but allow it to settle down before gentle road use and a check for leaks. After 500 miles, **replace the oil and filter** and check the valve clearances again, especially if they are rattling. They will "bed in" and need adjusting again quite soon.

Decoking does not affect engine or valve timing, ignition or carburation. It would be sensible to **balance the carburettors** afterwards, as following a decoke, the engine should be running more efficiently.

You are welcome to **comment** on these pages.

CX/GL500 Connecting Rod & Piston

The photos show parts from a CX500, but the 650 parts are very similar.

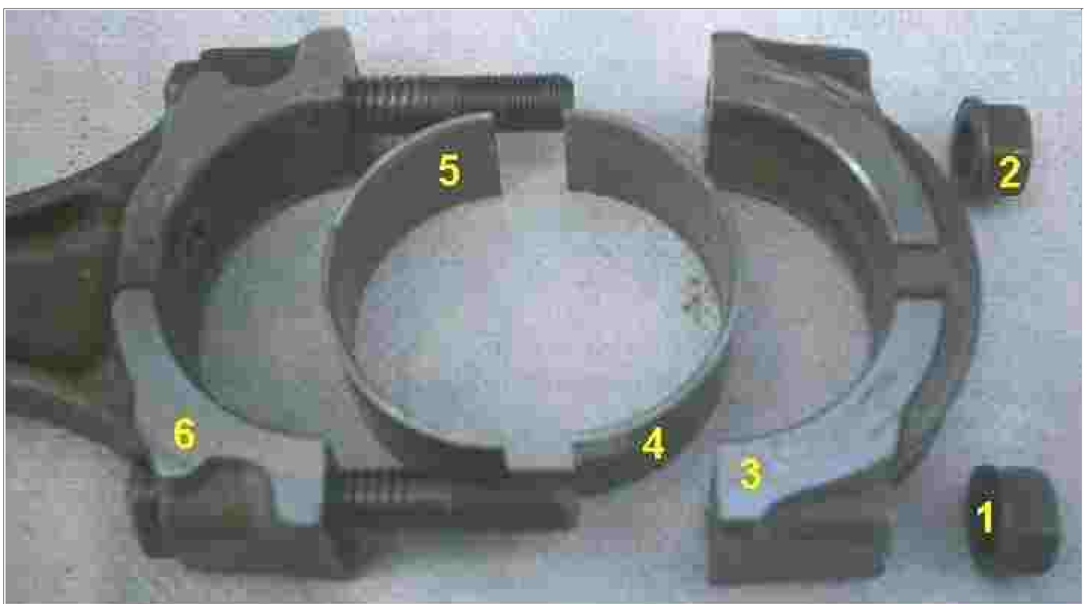
1 & 2 - end cap nuts. 3 - lower big end. 4 & 5 - shell (big end) bearings. 6 - connecting rod. 7 & 8 - gudgeon pin circlips. 9 - piston. 10 & 11 - compression rings. 12 - three part oil scavenging ring.

Connecting rod, shell bearings, piston, rings and end caps.

The piston rings sit in grooves machined into the perimeter of the piston, just below the crown.

The compression rings help seal the explosive force of ignition "above" the piston, driving it down the barrel. The lowermost three-part oil scavenging ring scrapes off any oil splash from the bores, and returns it to the sump.

Exploded vertical view of the same parts.



1 & 2 - end cap locknuts. 3 - lower big end. 4 & 5 - shell (big end) bearings. 6 - connecting rod.

Close-up of the "big end", showing the two halves of the shell bearing and how they fit inside the big end.

The shell bearings should never come into contact with the crankshaft, as they spin in a high-pressure oil bath which lifts them clear of the metal of the crank and also keeps them cool. (This is rather like how a hovercraft appears to float on water.)

If the oil supply fails, or is contaminated, oil pressure drops and ceases to lubricate and cool the shells, and they overheat, eventually welding themselves to the crankshaft.

This is called a "seizure" and is usually fatal for the engine.

Close-up of the piston, gudgeon pin (wrist pin to Americans) and little-end.

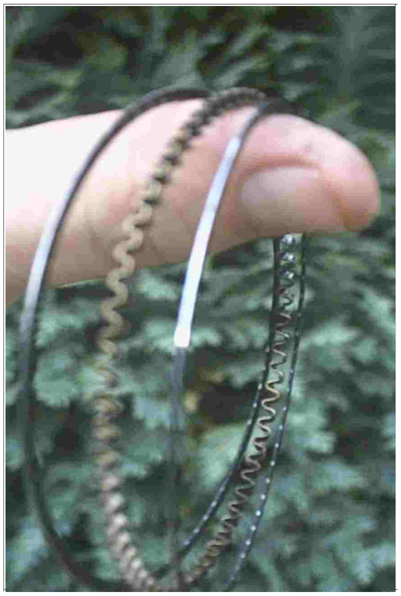
The gudgeon pin is hollow steel and slides through the piston side, through the little-end of the connecting rod and into the far side of the piston.

To make sure it doesn't come out, it's held at each end by a steel circlip.

Yoiu can see the small lips on the piston where the circlips are prised out of their grooves during dismantling.

1 - connecting rod & little end. 2 - gudgeon pin (US:wrist pin). 3 - piston.

Gudgeon pin circlips are ***NEVER*** re-used after being dismantled.



Close-up of the three-part oil scavenging ring. It consists of a pair of thin steel rings with a battlement-shaped spring in between. This composite ring is lowermost on the piston body, and it scrapes oil off the cylinder bores and back into the crankcase sump. This prevents oil from passing up "above" the rings, and into the combustion chamber, where it would be burned.

Once the engine has clocked up a very considerable mileage - and on CX engines, this is about 100,000 miles - the compression and oil scavenging rings wear to the point where they fail to seal the bores, and oil gets burned by the engine. Also, the bores themselves wear. The answer is a complete engine stripdown, with the the cylinder bores being "bored out" by 0.5mm, and new pistons and rings being fitted. This is (unsurprisingly) called a rebore and it's not very common on properly maintained CX engines.

Comparison photo of all three piston rings. The leftmost ring in the photo goes at the upper part of the piston body, with the three part oil scavenging ring lowermost.

1 & 2 - compression rings

3 - three part oil scavenging ring

1 - connecting rod
2 - piston
3 - gudgeon pin (US:wrist pin)
4 - big end (notice the oil feed hole)

Close-up of the little-end fitting into the piston. Note the large oil feed hole in the big-end area, and the smaller oil feed hole in the underside of the piston, where oil lubricates the gudgeon pin.

You are welcome to **email** me.


4

CX / GL 500 / 650 Engine removal

Words : Rob Davis. Pictures : Ian Shearer

The Honda CX / GL engine is quite a lump to work with. Whilst a strong person could lift it, manipulating it in and out of the frame is a job for two people. It is a potentially dangerous job if not approached carefully. Two people and a jack of some sort would be the minimum requirements.

The engine complete with radiator and starter motor weighs 155 lbs or about 60 kilos.

Skill / Time Levels

Skill : 3a. Personally dirty : 3. Work mess : 3. Space : 3.

Tools : 17mm, 14mm, 12mm, 10mm, 8mm socket and ring spanners; **torque wrench**; socket ratchet handle and extension bar; trolley, scissor or bottle jack; pliers; drain trays. ***All nut and bolt sizes are given for the spanner size required to fit them.***

Skill levels explained.

(Americans call a "spanner" a "wrench". A ring spanner is a "closed end wrench".)

Time : expert 45 minutes, average 60 - 90 minutes, "first time" 90 - 120 minutes. The world record for an engine swap is 28 minutes!

I am very receptive to comments and suggestions, but you use these pages entirely at your own risk.

This UK CX500E-C "Eurosport" has a bad noise coming from the starter motor area.

Remember that Eurosports have subtly different frames to As and Bs. Don't panic if the pictures don't exactly match up with your variant of CX or GL.

Drain the coolant by removing the radiator cap (*left*) and then unscrewing the 12mm nut under the front left hand side of the radiator (*right, ringed*)

. This is a soft plastic nut and easily damaged.

Although Ian removed his radiator in the pictures shown here, it's easier to work with it in place, and remove it with the engine as one complete lump. You don't need to detach the radiator unless you plan to :-

> work on the radiator, or change it;

> remove the front engine cover (ie get at the oil pump or chain)

> do serious engine internal work.

You can service or replace the clutch without removing either the engine or the radiator.

Drain the oil.

Pull off the long spark plug caps.

Disconnect the clutch cable at the engine end.

Remove both side panels. They are quite useful places to store any odd bits - nuts, bolts and so on. Unfasten the metal battery retaining strap and disconnect the battery from the negative (black) and the positive (red) strap. Now remove the battery and store it safely, where its contents can't be spilled.

This gives you more space and prevents accidental electrical damage.

Whilst you have it out, give it a clean, and check the electolyte level.

You don't have to **remove the carburettors**. In this example, Ian didn't, but it does give you more manoeuvring space if they are taken out. If you don't remove the carburettors, unfasten the inlet tracts between the carbs and the cylinder heads. Each is held on with 2 x 8mm bolts. Don't lose the O-rings inside.

Really it's easier to work with the carburettors removed.

Remove the seat. On the Eurosport it's held on by the 2 bolts visible at the bottom of the picture; on As and Bs there are 2 spring loaded catches under the seat.

Then disconnect the fuel pipes to the petrol tank. Vacuum-fed petrol taps have 2 pipes; other variants have one. The tank is retained by a single bolt at the rear, although some variants have two bolts at the front. Remove the tank and store it away from your working area, where it can't be damaged or start a fire. Don't store the tank at your only means of exit from a working area.

It's a good idea to replace nuts, bolts and washers where they came from, so you don't lose track of what goes back where.

If your bike has a fuel gauge, disconnect it. Here it's shown in the centre of picture. Disconnect the oil pressure lead (blue and red) and the low tension ignition lead (black with a white streak).

The side panels, battery, saddle and tank removed.

The
bike in this example has a Motad 2:1 one-piece exhaust fitted, which unbolted as a single unit.

If your bike has a standard 2:2 exhaust fitted, undo the 2 x 10mm nuts retaining the exhaust header pipe on the LH cylinder head. Undo the 12mm head clamp holding the header pipe to the H-box (collector box) underneath the engine and work the header pipe free. When loosened, it just clears the stubs at the exhaust port. Recover the copper crush gasket from inside the exhaust port.

Undo the 12mm head clamp holding the LH silencer to the H-box. Undo the 14mm bolt holding the LH silencer to the pillion footrest bracket and pull off the silencer.

Repeat with the RH exhaust system. Give the entire system a thorough clean and polish whilst it's disassembled, especially on the inside faces of the silencers, where the ribbed chrome tends to collect muck and rust.

Unbolt the H-box from its mounting points under the engine, and remove it. This is a good time to give it some fresh heatproof paint, or at least brush it free of rust and dirt. It looks good when sprayed with black gloss heatproof paint!

Here is an "exploded" photo of the standard exhaust components. The various types of 500 and 650 don't vary much, and what differences exist, are mainly cosmetic.

Undo the heavy duty cable to the starter motor. You may optionally remove the starter motor - held on by two bolts going inwards to the engine, directly behind

the starter motor body. Then pull the starter motor backwards to remove it. You may find it easier to remove the gear change lever first - it's held on from underneath with a 10mm pinch bolt.

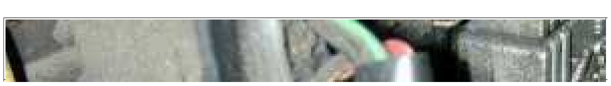
Inside the headlight nacelle, disconnect the rev counter (tachometer) cable. As you look at the assembly from the front, the tachometer is the left hand side drive cable.

Fold back the ribbed rubber boot at the RH lower rear of the engine, where the shaft drive disappears into the front of the swinging arm. Remove the pinch bolt on the drive shaft and push the heavy steel shaft drive backwards, to disengage it from the engine. Don't worry, you can't lose it.

650s don't have the pinch bolt, but are otherwise the same.

At the rear of the engine you will also find the neutral switch lead running upwards over the alternator area. Trace this to the wiring harness, and disconnect it.

Disconnect the water bottle from its feed pipe. There will probably be a slight coolant spill.



Disconnect all undersaddle connector blocks leading from the alternator (rearmost lower part of the

engine) to the various other electrical components; battery, CDI or Transistorised Ignition boxes. Thoroughly clean all the male and female connections.

Route the heavy cables from the alternator free of the frame so that as the engine is lowered, the cables are not pulled or damaged.

Disconnect the temperature gauge sender connector cable (*right*) at the top of the engine.

If you wish to remove the coils for improved access, trace their thin yellow and red leads from the coils back to the undersaddle area, and disconnect them. Unbolt the coils and store them out of the way.

At the top front of the engine (close to where the main spar meets the headstock) are the engine-to-frame retaining bolts.

Attach a ring spanner to the nut and a socket spanner to the bolt, and remove the nut. Don't withdraw the bolt yet.

Repeat with any other heavy mounting bolts. CX500As and Bs have three of them in a triangle shape, base upwards.

Here a Mole self locking wrench has been used to hold the nut, presumably because it's been chewed up by a previous spannerman. If you find nuts like this, replace them.

Remove the two short bolts holding the rear engine casing to the frame (directly under the carb space). Remove the nut on the end of the long engine bolt which passes right underneath the rear of the engine, but don't pull the bolt out yet.

The Z (original CX500), A and B models have two triangular shaped engine-to-frame mounting plates which are located at the top of the engine, just forward of the carburettors. You can see these on **this** page. Unbolt the plates and remove them.

Disconnect the black water pipe from the top of the impeller pump at the rear of the engine.

Caution!

Before using your jack to lower the engine, have a good look round its circumference to check that all connections and leads are free.

A useful accessory here is a 12" square block of chipboard or a short plank, to help the engine balance on the jack. Raise the jack until it has taken the full weight of the engine and now withdraw the engine mounting bolts which you previously loosened off.

Martin Groen, from Holland, comments "The 650, unlike the 500, has a lowered oil reservoir. If, while loosening the engine you need to support the engine in this lowered part only, it won't be stable. I used some extra wood to support both the reservoir and the bottom of the rear cover for proper balance."

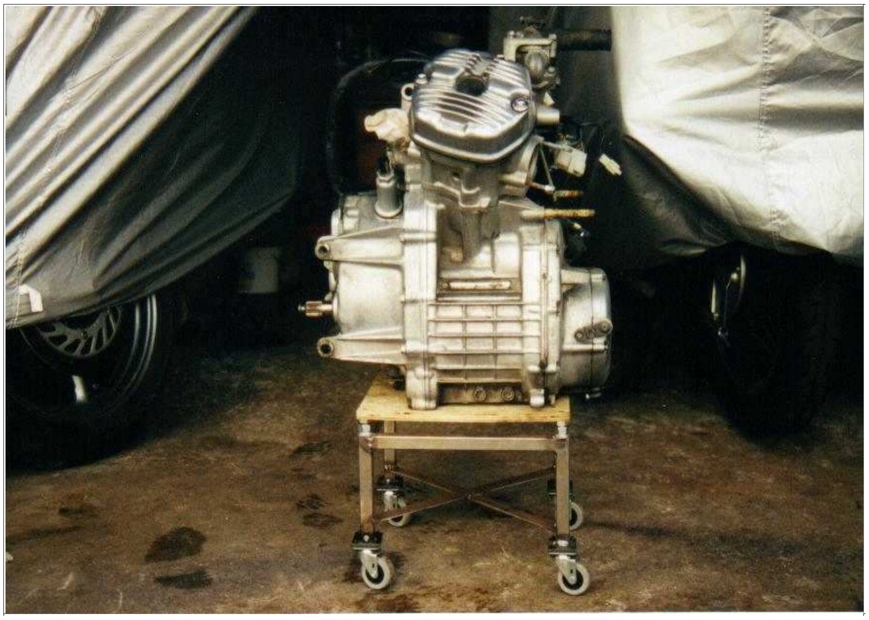
Lower the engine SLOWLY checking for anything still attached, it's easy to overlook a small connector, or to have some electrical cabling or piping trapped.

The engine, without radiator and starter motor, weighs 140lbs and is very top heavy and unstable. It needs 2 people, one to steady the engine, one to operate the jack.

If everything is clear, lower the jack fully. You may find it useful to bear down on the rear part of the bike, to raise the front, as you move the engine completely clear of the frame.

Withdraw the engine to the left, as then the rear brake lever doesn't get in the way.

Bob Kingsmill made up a trolley jack system which made it very easy (right) to manipulate the engine of his GL500.



Sture (in Denmark) made up a handy trolley (left) with an adjustable height platform.

One 2 man lift later, and the engine is on the bench. Strong and burly types can lift it without help, but it's a struggle. I was just able to lift it into and out of a car boot, but I don't think I could lift it onto a workbench.

If you must lift it on your own, stand astride it with your knees bent and lift using the power of your legs, keeping your back straight. Don't bend over the engine to lift it, you can damage your back doing it this way.

You can get it into the boot of a car by using a wooden ramp to drag the engine high enough to clear the lip of the car's boot area. Prepare the car boot with plastic sheeting and old towels, as oil and coolant will leak out from the CX engine. Lay it on its front end and pack it with old towels or boxes, to stop it rolling about as you drive the car.

Refitting the engine

Clean the engine casings as thoroughly as possible. Solvol Autosol is not the ideal cleansing agent; asking around other CX owners showed that the favoured method was an electric Dremel hand tool, with graded polishing wheels plus loads of time and elbow grease. Heatproof engine lacquer looks quite outstanding when applied to a freshly polished engine.

Generally, replacing the engine is a straightforward reversal of removal. It CAN be done single handed but it's far easier with two people. Some tips may be useful:-

> The shaft drive sliding collar is particularly awkward to engage with the gearbox output shaft, as the rubber boot gets in the way and space here is very limited. Fold the boot right back over itself before reinstalling the engine. Ensure the steel ring is installed over the gearbox output shaft, as the front edge of the boot engages with this and if you forget it, you'll have to drop the engine again to put it on (don't ask me how I know).

> When raising the jack and offering up the engine to the frame, beware that wires and cables don't get snagged and damaged.

> Clean off and grease all the engine-to-frame bolts so next time they will come out easily. I also push some grease well into the bolt holes. All this helps to stop corrosion developing.

> Fit the topmost front engine-to-frame bolt first and set the nut finger-tight. Then raise the rear of the engine and fit the long lower bolt. Finally insert the remaining bolts. Don't torque down the nuts until everything is connected up, as you may need to jiggle the engine to pass a cable or wire past some obstruction. Torque settings for the engine-to-frame bolts are surprisingly high, and are on **this** page.

> Check that all the electrical gadgets work (especially neutral and oil pressure) before starting the engine.

> I know you're raring to go, but have a coffee break before that first attempt to start the engine. When you come back refreshed, check everything again. You may find you have overlooked something. A second opinion here does no harm at all.

> You can test fire the engine without the exhausts fitted, but it is unbelievably noisy (dreadful popping racket) and the flames from the exhaust manifolds are astonishingly long, be wary of fire or burns.

Additional pictures

Eurosport frame after engine removal. Carbs are still fitted.

Rear of engine, before cleaning.

Rearmost small cover removed, showing the ignition sensors for transistorised ignition.

Ian says "This chrome water pipe bracket bolt did not want to come off, after drilling the top off the allen bolt."

Ian says "How not to do it. One must remember not to get carried away in the heat of the moment..."

Broken water transfer pipe mounting bracket.

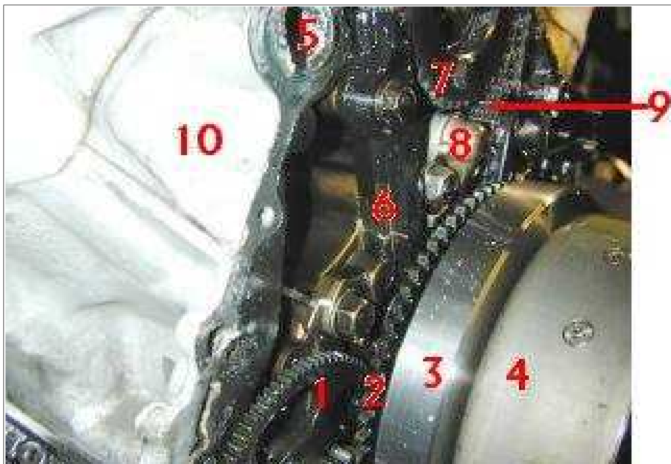
Water pump cover coming off (Ian says "after a great deal of persuasion").

Note the newspaper stuffed into open inlet manifolds, to prevent FOD (foreign object damage).

Water pump impeller removed.

Ian says "More persuasion later, the rear cover finally frees up (*right*). Remember, it has all been together for 18 years!"

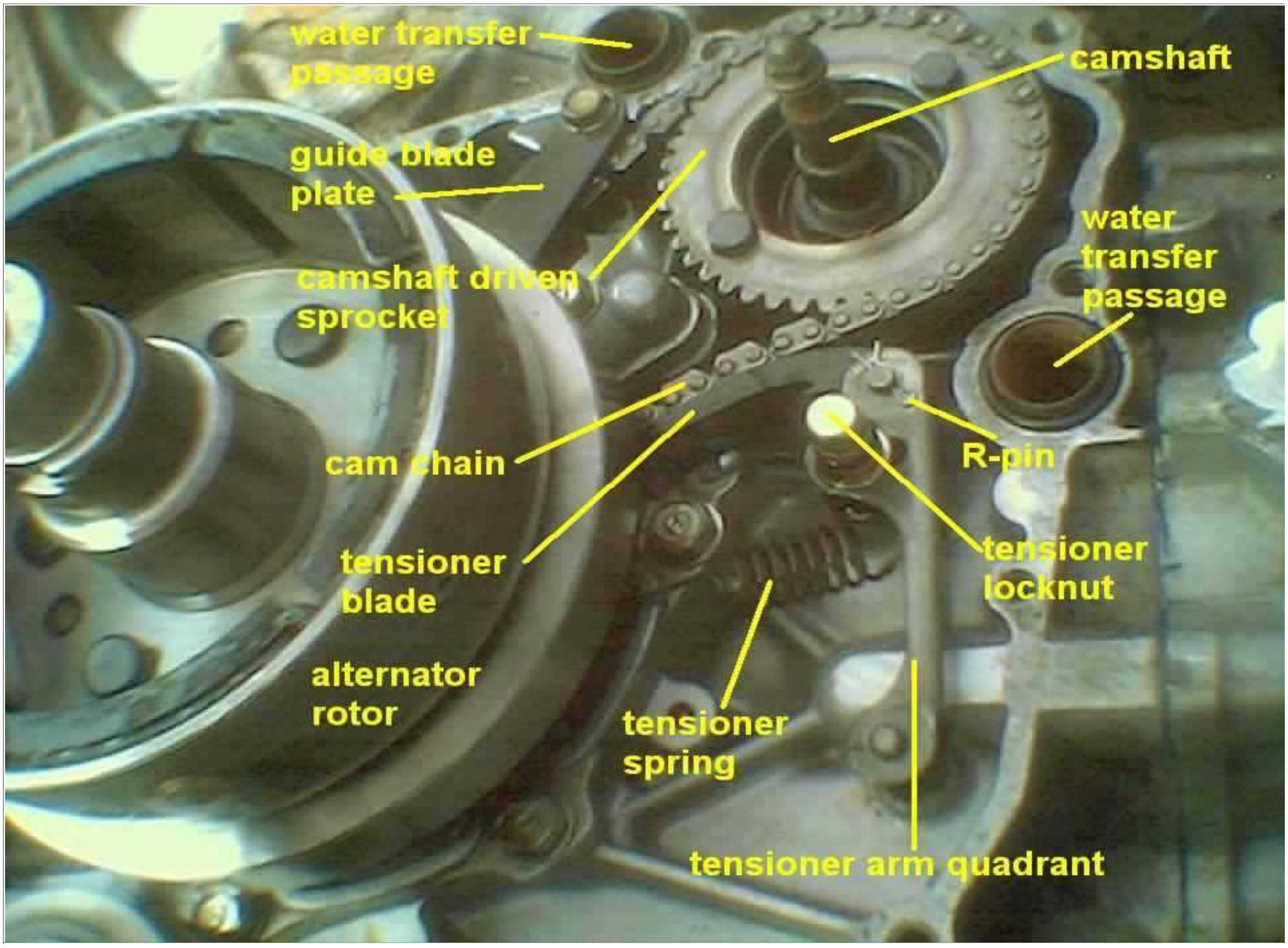
Stubborn rear engine casing bolts may need an impact driver to remove. I recommend replacing the standard Honda bolts with Allen screws.



1:starter motor drive gear. 2: starter motor driven gear. 3: flywheel. 4:alternator rotor. 5:left hand coolant transfer passage. 6:cam chain guide blade. 7:camshaft sprocket. 8:automatic cam chain tensioner. 9:cam chain. 10:central crankcase

Inside the rear casing. Here you can see the reason for the engine noise - the cam chain guide blade (6) is cracked.

Below is another view of the alternator rotor and cam tensioner apparatus from a CX500A. Note that this is the manual tensioner.



Loosening the alternator rotor retaining bolt. Ian says "Note my cunning device to stop the rotor rotating, fashioned from a pair of vicegrips, chain from an oil filter removal tool, and an allen key."

I'd recommend the proper Honda tool myself! The thread is the same as the oil filter bolt, but don't use the actual bolt to remove the rotor, as the bolt isn't strong enough.

If you can't use the proper tool, don't use a chain strap (hard metal type) as this cvan damage the alternator rotor. Use a strap wrench (fabric webbing type) instead.

If at first you don't succeed ... trying to get the rotor off its taper using the oil filter bolt - not recommended by Haynes, as it is not a solid bolt.

When refitting the rear cover, ***don't tighten the bolts until the action of the gear lever is found to be correct***. It's extremely easy to dislodge the gear level actuating teeth whilst easing the rear cover into place.

You certainly don't want to find that you can't select gears ***after*** you've replaced the engine in the frame ...

Some tips on refitting the engine

Brent in New Brunswick says *"If the shaft drive rubber boot gets too much in the way whilst you replace the engine, try pulling it backwards using bungee straps, to hold it clear whilst you engage the drive shaft with the gearbox output shaft."*

With the engine and a-frame (even the radiator, if you like) bolted up, jack the motor and push through the frontmost holding bolt just aft of the headstock. In effect this lets the engine pivot fore-and-aft, quite freely. Give the nut a couple of turns to ensure the bolt can't drop out and check the harness isn't trapped if the engine moves.

Be sure the rubber boot is over the front end of the swinging arm - and that the flange it fits onto is on the back of the engine case!

With a pal holding the engine for a few seconds, relocate the jack under the rear case and edge the engine up, feeding in the drive shaft collar as the engine is very gently raised. As it pivots on the singe front bolt, you can jiggle it quite a lot to help you marry up the shaft.

As soon as the shaft is engaged, pull the sliding collar forwards and pin it with the pinch bolt. Now raise the engine fully and wiggle it in between the rear bolt locations and then slip the long bolt through the underside, followed by the others. Do them finger tight as you may still need to wiggle things a bit more to get them all in.

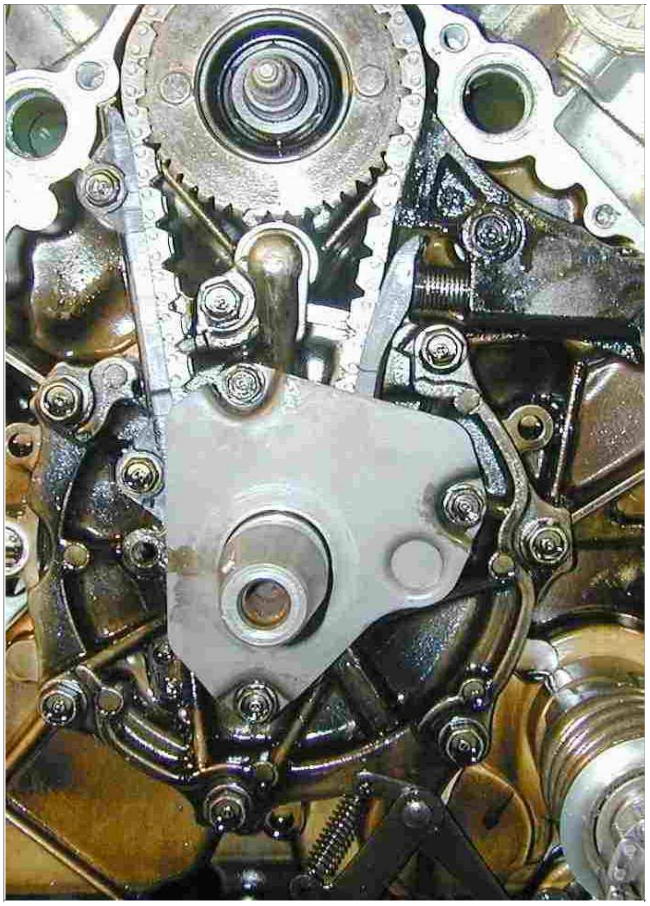
I can see that having the gearbox in gear might well help as the two bits of the transmission shaft marry up. There's enough play in the shaft drive end to let you engage them.

This method gives you a lot more finger space in what is a tight spot. Once the motor is fully bolted in there is very little space to work.

View of the cam chain and tensioner assembly after the alternator rotor has been removed, but before the tensioning apparatus has been dismantled. This shows the cracked camchain

guide blade (left run of chain) and the cracked tensioner blade (right run of chain).

Note that this Eurosport model has the short tensioner plate; this is correct, as it has the automatic tensioner. Compare this to the modified type, with the extended upper plate, in the pictures above, for a Z, A, B, C and D models.



Special tool to remove the clutch centre bolt, made up from a socket trimmed down with a hacksaw. True home engineering, this!

Clutch out and dismantled.

Sparkling-clean clutch plate after the glaze has been removed.

MANY THANKS indeed to Ian Shearer who spent a lot of extra time putting down the spanners, wiping his hands, and then taking the pictures. A sure way to make sure that the job took twice as long as it should have done.

Maurice McAllen sent this picture (right) of the starter motor clutch roller assembly.

CX500 Z, A, B or C engine removed as a complete unit, complete with radiator, engine hanger and carburettors. Other variants have only minor visible differences.

You are welcome to **comment** on these pages.

CX500 / GL500 / CX650 / GL500

Engine Swaps

A frequent question on the Message Board for the **CX/GL Owners' Club** (UK) is *"How do I cross fit engines?"* This page assumes that you are not swapping the CDI or Transistorised ignition systems, just cross fitting the actual engine. In either case, retain the 'black boxes', harness, high tension coils, plugs, caps and leads.

This information is given in good faith. I welcome **feedback and comments** but you follow these instructions at your own risk. I have personally fitted an EC 500cc "transistorised" engine to a 500cc "CDI" bike, without problems.

If you want to swap the CDI ignition CX500 engine (models Z, A, B, C, D) into the transistorised ignition CX500EC (Eurosport) frame, this is what you have to do. Some early GL500s have CDI ignition, but mostly they are the transistorised type.

You can retain the following from the ZABCD bike : *engine centre section complete, with manual cam chain adjuster; engine front section with clutch; however retaining the alternator rotor is optional.*

You will need the following from your EC bike : *radiator, left and right engine front hangers, gear lever; rear engine case complete; stator complete with harness. The EC rear case is longer than the ZABCD and the water bottle is shaped to suit.*

You ***cannot*** swap the manual cam chain adjuster for the automatic type, or vice versa.

Offer up the EC rear case to the ZABCD centre section and very accurately mark where the manual tensioner locknut needs its hole drilling; measure the diameter of the locknut and the hole inthe other case, and drill the hole in the EC's rear case.

As you are re-using the EC alternator rotor, rear case complete with stator, mechanical advance mechanism and engine breathers, this is all you need do. The ZABCD engine will work perfectly well mated to an EC rear case, provided that you don't mess up making the manual tensioner locknut hole. The EC engine will ignore the brass timing plug on the CDI type rotor.

If you want to swap the EC transistorised engine into a ZABCD bike with CDI ignition, this is what you have to do:-

You can retain the following from the EC bike : *engine centre section complete, with automatic cam chain adjuster; engine front section with clutch.*

You will need the following from your CDI bike : *radiator, engine a-frame (front hanger), gear lever; rear engine case complete; alternator rotor; stator complete with harness and advance pulsers.*

The EC rear case does fit the ZABCD engine but as it's longer, it will foul the water bottle.

You ***cannot*** swap the manual cam chain adjuster for the automatic type, or vice versa.

Offer up the ZABCD rear case to the EC centre section and very accurately mark where large 14mm black auto tensioner lock bolt hits the inside of the rear case. You can either *(a)* machine off half the depth of the bolt's head or *(b)* enlarge the manual tensioner locknut hole to accommodate the bolt's head. Either way, seal the hole afterwards, from the outside, using plastic metal.

You ***MUST*** use the ZABCD alternator rotor with the brass timing plug, as the advance pulsers on the CDI stator harness depend on this to work.

I hope to expand this page with details of fitting the 650 engine into the 500 frame.

CX / GL 500 / 650 Tachometer / Rev Counter Drive Cable Replacement

Skill levels explained.

Skill Level : 2. Personally Dirty : 1 : Work Mess : 2. Tools level : 1 : Space required : 1

Time : *expert* 30 minutes, *average* 45 minutes, *"first-time"* 60 minutes.

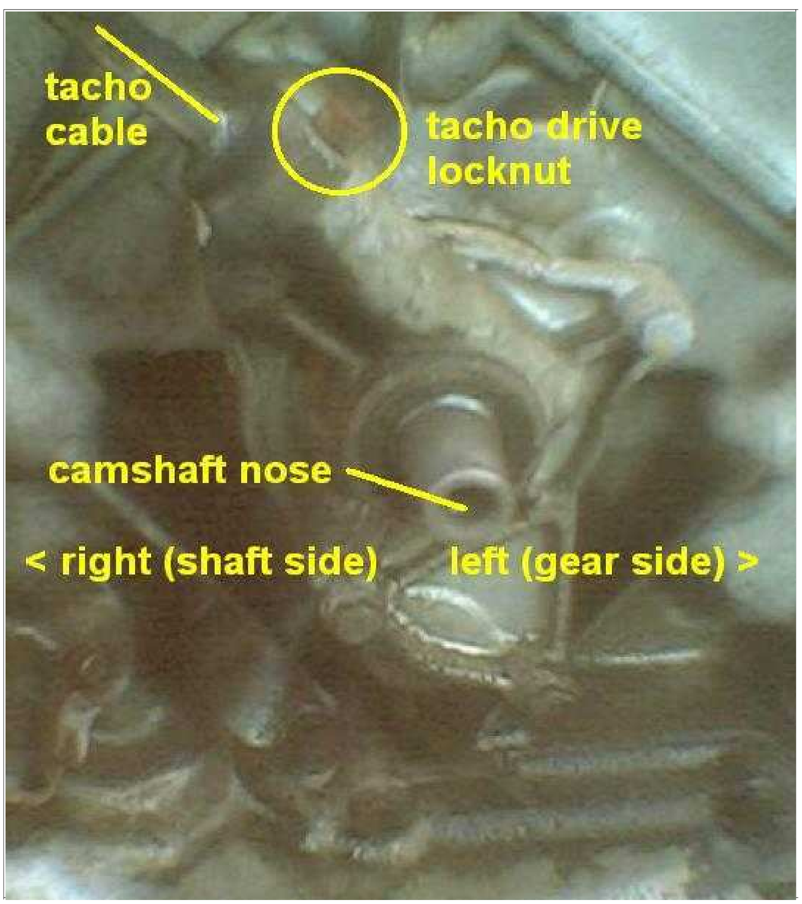
All the hands, tools, and bike in the photos are the author's.

All nut and bolt sizes are quoted as the spanner size required to fit them.

I am very receptive to comments and suggestions, but you use these pages entirely at your own risk.

If inside the headlight shell for any reason, it's sound practice to unscrew both the speedometer and tachometer drive cables from the underside of their instruments, and to drip some very light oil down the inner cable run. This will prolong cable life.

The tachometer or rev counter drive cable is particularly prone to breaking somewhere along its inner run, leaving the rider with no engine speed display. The new drive cable is easily obtained for about £10, but the problem lies in the removal and refitting, as the engine end of the cable is extremely difficult to reach. The pattern tacho cables are apparently not very long-lasting, so always use the genuine Honda ones.



At the front of the engine, at the base of the vee of the cylinders, and behind the radiator and fan, lies a small aluminium housing (left). The nose of the camshaft passes through an oil seal inside this casing and has a bevelled gear drive which, via a sister bevel, drives a tongued spline. This in turn engages with the engine end of the tacho cable, twisting it as the engine runs. The inner run of the cable passes up to the tachometer and turns the dial, displaying the engine speed.

(In case you ever wondered why there is a delay between starting the engine and the tacho doing anything, it's because once the engine stops, the twist in the inner cable relaxes, and it takes several seconds for the twist to work it way upwards as the engine starts.)

This housing is tucked right behind the

fan and radiator and is almost impossible to reach without removing these two parts. That's the bad news - which explains why so many CXs run around with dead rev counters, many owners putting off draining and removing the radiator until something else necessitates it.

If you have an oil weep or stain coming from behind the radiator, the camshaft nose seal has failed, and you can easily change it once the radiator and fan are removed. In such a case, you'll need a new seal and a new drive casing gasket.

The engine end of the cable is retained by a single locking bolt, with either a standard hexagonal head, or more possibly an Allen (countersunk hexagonal) head. This is inserted from, as you view the front, the two o'clock position, with the threads on the casing being at the corresponding eight o'clock position.

If the previous owner of your CX was savvy enough, he will have (a) used an Allen bolt as the retainer and (b) inserted it from the 8 o'clock position, i.e. opposite to normal, and with the screw threads engaged first. This is simply because, from the 8 o'clock position, a long screwdriver or socket can ***just*** reach the retaining bolt around the side of the radiator assembly.

So before you decide not to bother changing the tacho cable, first remove the fuel tank. Then get a good quality lamp and shine it upwards from just by the right hand side lower engine hanger bolt, past the fan and radiator, and pick out the tacho drive assembly. It's a roughly diamond-shaped piece sticking forward from the main engine casing, immediately behind the fan. Now look at its lower edge, the one nearest to you. Can you see the head of the retaining bolt? If so, you are lucky. Use a long screwdriver or socket to withdraw the bolt, pull out the old cable, push in the new one, push down and twiddle the handlebar end of the new cable's inner run until you feel the tongue engage with the drive at the engine end, and once you've taken the old cable off the tacho unit, you're home and dry. Replace the retaining bolt, screw the handlebar end of the new cable to the tacho, and that's it.

However, Sod's Law being what it is, the retaining bolt has either frozen up in its hole, or is still inserted form the 2 o'clock position. Unfortunately. this is the time to bite the bullet and remove the radiator and fan, as you simply can't reach the retaining bolt any other way.

The good news is that this is not a difficult job. You will need a drain tub for the coolant, 12mm and 10mm ring spanners, a crosshead or ordinary screwdriver, a torque wrench, new coolant, and about 45 minutes of your time.

If you own a 650, you are even more lucky, because you have an electric fan, and you don't need to rustle up a front axle, which has exactly the right thread to pull off the mechanical fan. 500 Z, A, B, C, D owners - you will need to borrow your own or a pal's front axle, unless your spares bin has a bolt of the same thread size.

Ensuring your engine is cold, remove the radiator cap and pull off the slim rubber overflow pipe (left).

Remove the radiator grille. On Zs, this is a complete one piece black plastic shroud with a honeycomb grille. On most other bikes, remove the two bolts which hold the bottom of the grille retaining plate and once this is off, the grille drops out.

Now undo the 14mm plastic drain bolt which is directly under the radiator, and drain the fluid into a clean plastic receptable, about half a gallon capacity. Undo the top radiator hose (right), at either the thermostat end (under the main spar) or the radiator end. The other radiator hose is attached in an identical way but at the bottom of the opposite side of the radiator, and when you slacken and pop off this hose, more coolant will probably spill out.

The photo on the right shows the engine removed from the frame, but these shots were taken when the engine was out anyway. Don't worry, you don't need to remove your engine to do this job.

Remove the two 10mm chrome dome-headed nuts (left) which hold the radiator to the right hand side of the engine hanger, and the single one on the left hanger.

The chrome mushroom bolts pull out of their rubber mounts (right) and then the radiator now pulls off forwards and to the left, ease it around the front brake lines. Whilst it's off, it's a good idea to run fresh cold water from your garden hose through it for a minute or two, from the bottom upwards, to reverse-flush out any muck and accumulated debris.

I am not exactly sure how the electric fans come away; I am guessing that they unbolt, disconnect and pull straight off. Mechanical fans have a retaining bolt in the centre, which screws into the nose of the camshaft; remove this with a 12mm ring or socket. It may help to put the bike in top gear and apply the footbrake, to stop the engine turning as you move the bolt.

With the bolt out (left), screw in the front axle tightly to the fan's hub and tap or wiggle it free.

500s have the mechanical fan which is a push fit on the end of the camshaft (left). 650s have an electrical fan triggered by a thermostat; this type comes off as one unit.

Don't give the mechanical fan hard knocks as the hub is soft aluminium. The fan can be a tight fit, and one way to get it off is to knock a long thin wooden wedge between the rear of the fan boss and the tacho casing, remove the wedge, move it round 90 degress and repeat. This usually persuades a reluctant fan to part from the camshaft.

If you have a previously unseen oil weep from the housing area, or the seal here has done more than 20,000 miles, buy a new camshaft nose oil seal and housing gasket, as this is a good time to unbolt the tacho drive housing, and change them.

Remove the drive cable retaining bolt , pull out the old cable and insert the new one, rotating the inner cable until the drive slot is engaged. To check this, briefly spin the engine with the kill switch set to "Off". If the handlebar end of the drive cable rotates, the engine end is correctly engaged.

Now the clever part - reinsert the retaining bolt from the opposite, 8 o'clock position, i.e. screw threads first. Next time the tacho cable needs replacing, it will be a doddle!

Reassemble, using 15 ft lbs of torque on the fan retaining bolt and no more than 9 ft lbs on the chrome radiator retaining bolts. The plastic radiator drain bolt should be done just a little more than finger tight. Too much spanner force and the bolt will shear off. DON'T use a metal replacement bolt as this will react adversely with the antifreeze.

Note that there is a small steel pipe, an oil passageway, connecting the bottom of the tacho housing to the front engine casing. This should have a new o-ring fitted round it.

I suggest that you always change the antifreeze as matter of routine. Use a 50/50 mixture of non-sillicate (Halford's Advanced Formula) and distilled, or battery top-up, water. Nonsilicate antifreeze greatly prolonges the life of your water pump, particularly the mechanical seal, which are both at the other end of the camshaft. Fill the radiator to the top at the cap, and once the engine has warmed and cooled again, top off at the radiator and and fill the expansion bottle to the maximum mark.

Routing the tacho cable correctly is important. It exits from behind the radiator assembly at the 10 o'clock position, and then curves over the radiator top, into the headlight area, through an inverted U-shaped clip, and then vertically towards the tachometer instrument. Avoid sharp bends in the cable, and don't tie-wrap it so that it has to make anything other than as gentle a bend as you can.

If you change the camshaft nose seal, it goes into the drive housing with its closed end forward. Remove all traces of the old gasket, clean both mating surfaces thoroughly, and use a sealing compound like Hylomar to help the join.

When restarting the engine, allow it to idle up to normal operating temperature, to check for coolant leaks, before a road test.

You are welcome to **comment** on these pages.

My CX / GL Won't Start or Runs Poorly

The CX500 family of engines are particularly prone to starting problems if the bike is left idle for several weeks or months. This doesn't usually signify a serious problem, but coaxing a CX mill into life after some time of inactivity can cause you some stress. Here's how to persuade / coax / force that V-Twin alive again.

Firstly, if you plan to lay up your bike for winter hibermation, as I do, then make a point of starting the engine once a week and letting it idle for 20 minutes. This keeps things in order and keeps the battery charged.

If for some reason you can't do this, remove the battery and top it up if necessary before laying up the bike. You can leave the battery on a trickle charger if you want.

There is additional information about reluctant and non-starters in the **Fountain Of Wisdom** page.

OK - so the engine won't run at all. What should you check first?

Two daft ideas first...

Is there petrol in the tank? It's not unknown for petrol to be stolen, so if you are doubt, switch to reserve and have a look inside the tank. No, ***NOT*** with that naked flame ...

Is the kill switch on the right hand side handlebar cluster set to ***"Off"*** ?

Is the battery dry, partly dry, or more than a couple of years old? Many starting and running faults are caused by a bad battery, and this isn't always obvious at a visual inspection. Try jump leads (see further down the page) or fit another battery, which is known to be good.

Ok, now for some more detailed faultfinding.

Do the neutral and oil pressure lights come on when you turn on the ignition? If ***NO***, the battery is flat or there is a bad contact. Charge or replace the battery, you can use jump leads from a car, but don't use them with the car engine running. Disconnect and clean the battery's contacts with a stiff wire brush, and afterwards smear them with Vaseline (not grease).

You fuses may be faulty. To the side of the battery is an opaque bullet-shaped fuse holder which splits longways. Check that this fuse has not blown, as it's the main power line. Other fuses are in the handlebar section, under the flat plate which lies directly behind the ignition key hole.

Does the starter motor whir when you press the button? If ***NO***, despite having charged it, the battery is probably knackered. If there is an audible click when you press the starter button, but no starter action, locate the starter solenoid to the side of the battery and clean its connections with a stiff wire brush, then Vaseline them. If this has no effect, disconnect the thick wire strap from the starter motor where it joins the solenoid, and using a pair of insulated pliers to hold the strap, momentarily touch the disconnected end to the battery's positive (+) terminal. This bypasses the solenoid. If the starter kicks off, the solenoid is knackered, replace it. You may still be able to bump-start the engine, especially if it's warm.

If your starter motor starts to smoke, stop at once. The starter motor has either developed a major fault, the starter clutch has failed, or the engine has seized. All these are serious or even terminal faults, and outside the scope of this page.

As the bike ages, you tend to get corrosion in the handlebar switchgear. Split the right hand handlebar switch cluster by removing the two long screws from underneath, and thoroughly clean the contacts for the starter motor button and the lights. Then either spray them with WD40 or rub with Vaseline (not grease). If the switchgear is very corroded you will have to replace the bad parts, or even the entire switchgear assembly.

Sidecar Bob comments *"WD-40 is primarily a Water Displacer, and also works poorly as a cleaner and not very well at all as a lubricant. Wrapping the connectors with plastic isn't the greatest idea either - if the bike is out in the rain, water WILL eventually find it's way inside the plastic, and will probably stay there long enough (it can't easily evaporate) to do some damage. And WD-40 only displaces water when it is liquid - after it dries, it is only residue that dirt can stick to. Cleaning the contacts with contact cleaner and then applying dielectric grease will work much better."*

If the starter motor whirs very quickly but the engine doesn't turn, then the starter motor clutch is faulty. This unfortunately means removing the engine and alternator rotor, but corrective work is not difficult. In such a case, there is sometimes a pronounced thunk as the starter motor is just about to stop turning. This is the one-way drive disengaging. The bike may still bump start, especially if warm, if the sparks and fuel are good.

Okay, the battery is fine, the starter whirs, but still the engine won't run.

Remove one sparking plug and reconnect it to the plug lead. Rest the plug's metal body on the engine casing (not the cylinder head covers - use the actual cylinder head, or the exhaust pipe) and briefly spin the engine on the starter motor.

Is there a spark at the plug? If ***NO***, try a new plug. If this has no effect, check the thin wire from the black barrel-shaped ignition coil under the fuel tank is connected to the wiring harness. Trace the wire back, and it's worth cleaning its contacts. Still no joy? Do the same with the other sparking plug and coil. Then, replace the long spark plug caps with either new ones or ones known to be good. Try yours on another engine.

So - now you know that you have no spark at either plug, but the engine turns over strongly on the starter motor and the connections to the harness are good and have been cleaned up. Remove the tank and saddle and trace the thin black wire with a white streak. This is the low-tension ignition circuit and it runs to the ignition switch and the kill switch. Normally, this circuit is "open", i.e. not connected to earth, and the engine should run. However, a fault on this wire, such as where it has chafed on the frame and is rubbing on something metal, can short the circuit to earth, causing loss of ignition. This is how the kill switch works - when you flip the kill switch, or switch off the ignition, the low tension ignition circuit is earthed, and the engine stops. A short circuit here will do the same as using the kill switch. Disconnect this wire and try again for a spark

You can test this circuit with a multimeter, or a simple 12v bulb and some wire. When the engine is supposed to be running, this circuit has no earth connection, it's "open". If you connect a 12v supply to a short length of cable, with the other end of the wire on the bulb and the bulb touching the low tension ignition wire, the bulb should not light up. If it does, or the multimeter shows a connection to earth, the wiring is faulty. Somewhere in its run, it is making an unwanted earth connection. This is usually either a failed kill switch or a chafed wire somewhere.

Try disconnecting the wire inside the headlight shell, to eliminate the kill switch. If the circuit then behaves properly, the kill switch is defective. Otherwise you will have to examine the main wiring harness carefully in the undertank and headlight area, to find the damaged part. Favourite places to chafe are (a) at the edge of the tank (b) against the engine holding nuts and (c) on entering the headlamp shell. If you find the chafe, reinsulate the wire and the harness immediately around it, and reroute the harness if possible to avoid further damage.

You can safely leave the low tension wire disconnected ... but then the only way to stop the engine is to stall it or turn off the fuel tap!

If you have CDI ignition, the next step is to test for a failed CDI unit. The only proper way to test this without specialised electronic equipment is to swap it for one that is known to be good, and to test yours in the other bike. However, you can make sure that the CDI unit is producing the correct current to the coils. You'll need a multimeter; set it to AC. Trace the left hand coil (with the yellow wire) back to its connector with the CDI under the saddle, and disconnect it. Poke the positive lead of the multimeter into the lead from the CDI and the negative lead to a convenient earth, perhaps the battery's negative terminal. Spin the engine and you should get about 180 volts DC or 50-60 volts AC.

Gary Lowell adds: *"I was recently having problems starting my 1979 CX500. After living inside your website for a week and trying everything possible. I've come to realize that I probably have a bad CDI. The last diagnostic came down to 2 things. Stator or CDI. Based on advice from a local motorcycle mechanic I tried this test:-*

Set multimeter to DC. Clip leads to battery (Black -, Red +); should register close to 12v. Start engine; should be at around 14V at a high idle. If this is your situation then apparently your stator is charging your battery.

I hope this is helpful. It was a simple test that wasn't anywhere in the manual or on your website (my new bible)."

Reggie-CX (an electrical wizard) adds : *"I was doing some electrical testing on the bike today and thought you may find this useful.*

Coil testing: a coil can appear fine but break down under pressure. You can only prove this by substitution. This basic test will give a general indication of its health.

(1) Primary side test. Disconnect the yellow and peach wires under the seat. Zero the leads on your meter by clamping them together and noting the value displayed; typically around 1 Ohm possibly less. (NB as its normally such a low resistance we want to be able to discount the resistance in the leads). Clamp the negative lead to the battery earth terminal and the positive lead to the yellow or peach wire going to the coil. I get about .7 Ohms (zero point 7) on a good coil.

When you consider where the current goes, from the meter, through the coil then through the frame to the earth terminal, this also tells me that the coils are well earthed to the frame. So a high reading here may indicate bad earthing rather than faulty coils.

(2) Secondary side test: Leave the test lead clamped to the battery earth. Remove the plug cap and measure the resistance between the wire
in the centre of the HT lead and earth. This should usually read around 8,000 Ohms (8 K)

Why remove plug caps? Some plug caps have resistors inside which act as suppressors. My original ones were troublesome so I changed these for straight through types."

Reggie has made up an excellent page on starting problems.

If you have transistorised ignition (500 Eurosports, GL500s and all 650s) I can't advise a test as I've never worked with one, perhaps a reader can comment?

If you have no luck by now, you are most likely to have a failed alternator stator. This can be diagnosed **here**.

Now let's assume that you have a good fat spark but the engine still won't run at all.

To bump-start your bike, turn on the ignition, fuel, pull out the choke, make sure the kill switch is set to "run" and the gearbox is in neutral. If you have a couple of strong chums to push you, this can be done on the straight and level, but be warned, it's no mean feat to push start a heavy CX on the flat. If at all possible, get your bike up to the top of a hill or slope. An icy, slippery, or wet surface is not recommended.

Either way, get the bike up to the fastest speed you can. Being pushed is unlikely to get you over 10 mph, but coasting downhill, you can get up to 20+ mph. Whilst still in neutral, pull in the clutch and as quickly as you can, toe the gearbox into 3rd gear. You have to be quick with this, as the cold engine and clutch will drag quite a lot. Then, let the clutch out sharply, with as much throttle as your engine normally needs when it starts.

Be ready for the back wheel to lock up briefly. If it stays locked up, declutch, stop, and try again in 4th or 5th gear. But hopefully the engine will stagger into life, even on one cylinder. Declutch, tease the engine up to 3,000 rpm and select neutral. Allow the engine to warm up before you do anything major with it, and then ride to the top of a slope, switch off, and try a normal start. If the engine won't go on the starter motor, you can always bump-start it again.

Being towed by a car is a dangerous way of bump-starting as it tends to induce a lot of wobble to the bike under tow, and you can easily get pulled over sideways. You can do it if you are extremely careful.

Jump *or* Booster Cables

If you use jump or booster cables from another vehicle to help your bike battery, don't run the other engine. Attach the black (negative) jump lead from the negative post on your bike's battery to the same post on the other vehicle's battery. Then attach your red (positive) lead from your bike's positive post to the same one on the other vehicle. Once one end of the red lead is connected, take great care not to touch the other end to any metal parts of either vehicle, or a powerful short circuit will result, damaging components and possibly starting a fire. Always connect the leads ***first to the flat battery*** and ***then to the good battery***.

Remove each spark plug in turn. Is it damp or wet, can you smell petrol on it? If ***NO***, then the petrol feed to that particular carburettor is faulty. **Remove the carburettors** and give them a good clean, under surgical conditions if possible. If both plugs are dry, it is more likely to be a problem with the fuel supply as a whole. Try changing the fuel - swill out the tank and use fresh petrol, or rig up a temporary feed (beware of fire). Use a new length of fuel pipe between the tank and the carburettors; I like to use clear plastic piping so I can see that fuel is actually flowing. Some owners fit an in-line fuel filter to trap any foreign matter.

Variants with an automatic (vacuum operated) fuel tap are distinguished by having two or sometimes three pipes connected to the fuel tap. One is the petrol feed to the carburettors, and the other pipes are connected to the inlet tract between one carburettor and the cylinder head. As the engine turns over, a vacuum is created in the inlet tract and up the pipe. The fuel tap has a valve which is spring loaded closed, but opened by a vacuum. Thus whenever the engine stops, the vacuum decays and the valve closes itself. If this vacuum pipe is blocked or obstructed, no fuel can get to the carbs. To test this, disconnect the fuel feed pipe at the tap end and hold a small jar under the tap. Turn on the tap, no fuel should come out. Now disconnect the other pipe(s) at the carburettor end, and suck firmly to simulate engine vacuum. As you suck, the valve should open and fuel should spill out and into the jar. If it doesn't, then either the pipe is blocked - easily checked with a rod or pipe cleaner - or the tap is faulty.

Also it's not unknown for the pipes to be cross connected at the tap end, i.e. the vacuum pipe to the fuel feed and the fuel feed pipe to the vacuum left. The vacuum pipe(s) face inwards towards the main spar, the fuel feed pipe faces backwards.

Drain the tank and remove the tap from the underside. Pull off the tall gauze filter. This can disintegrate from old age or get blocked with dirt, so clean everything thoroughly and also fit an inline filter - these are only a pound or so from your local marina and they fit along the run of the petrol pipe. Make sure you fit them as indicated by the directional arrow!

So now you have : good sparks, good fuel, but still the blasted thing won't run at all.

Having reached this point we are running out of options. My own experience of the CX engine is that it can be very perverse, and that the solution is gentle coaxing. Here are some hints:-

> ***A good condition battery is essential***. CX engines have a massive compression ratio and a battery which appears to be 100% in terms of spinning the engine and working the lights etc can in fact be weaker than it looks. Try jump leads, from a car or a spare battery. In fact I'd recommend using a secondary battery when you first start your CX after it comes out of hibernation. If you use your car as a booster, don't run the car engine.

> ***Don't run the starter motor for more than 20 turns*** at at time, and if it gets too hot to touch, let it cool down.

> ***CX engines seem to like being tried and then left*** for 10 minutes. I dunno why, but if the engine starts to show signs of life, whilst it's so very tempting to continue trying, walk away and have a coffee break for 10 minutes, then try again. I know this technique does work.

> Push the choke lever in and apply 1/2 inch of throttle instead as you spin the engine. This seems to clear the combustion chambers. Experiment with variations of choke and throttle.

> ***Squirt WD40 or suchlike directly into the air intake*** box. This gives an artificially rich mixture and has been known to start the most reluctant engine. The Australians apparently have an aerosol called "Start You Bastard" which neatly illustrates the point!

> ***Peer at the carbs whilst operating the choke*** lever. Does the linkage work BOTH left and right carbs? The linkage might be broken, obstructed or misaligned, leaving only the left carburettor choked when you pull up the lever. Also, I've seen cases where the soft rubber boot from the airbox to the left carburettor has gone a fraction too far over the aluminium body of the carb. This leaves the inside edge of the rubber boot fouling the choke mechanism to the right carb. Slacken the circlip and slide the boot 1/4" backwards, then retighten the circlip and check the choke action

again.

Sidecar Bob adds that on his CX650 the carbs "... are mounted splayed ... the chokes are connected by a pair of metal strips (like leaf springs) connected to the chokes, pointing towards the air box, with a pin on one and a hole in the other. This allows for the angle between the shafts and permits easy separation of the carbs. The leaf on one carb had somehow become bent (if it wasn't so hard to get at, I might suspect vandalism) and disengaged from the other, hence the hard starting and one side starting after the other and the popping from the exhaust ."

The engine runs on only one cylinder

CX engines are well known for the peculiarity of starting on one cylinder (usually the left one) and then the other one chips in suddenly as the engine warms. I'm blowed if I know why this happens, but it's fairly normal and unless you have serious starting problems, I wouldn't worry about it, if the engine runs ok when it's warmed up.

If you're not sure which cylinder is firing, cautiously feel the cylinder head or the exhaust manifold, be careful as these parts, especially the manifold and downpipe, get very hot very quickly. After even a few seconds, the cylinder which is firing is definitely warm, and the bad one will still be stone cold.

However, if you have an engine which simply will not run on both cylinders, try these tips. I'l assume that you have the normal situation of the ***left*** cylinder firing and the ***right*** one not being interested.

I'll assume that you checked the fuel, and that the choke mechanism is operating on both carbs.

On the cylinder which won't go:-

> ***Check the spark*** (as per the above section) and replace any doubtful parts such as plug cap etc.

> ***Test the coils***. Try the left spark plug in the right plug cap, to diagnose the plug. If the left plug (which is known to be ok) does not work in the right plug lead, then:-

- either the thick ***black HT lead is faulty***. These come as part of the coil, but you can try unscrewing the plug cap and trimming off 1/2" of the end of he thick lead. You do sometimes get corrosion or wear here. Remember though that if you trim off too much, the lead won't reach the plug, once the plug cap is back on. Also try wrapping insulating tape all along the lead, in case it is "leaking".

Sidecar Bob comments *"While I have no reason to doubt that you are right concerning early models, the coils from both my '81 GL500 and the CX650E I took apart last summer are the type that allow replacement of the wires. In fact, I would recommend that anyone with an older model replace their coils with the newer type and put on new HT wires before they get stranded somewhere in the rain with no spark because their HT wires are leaky."*

- the ***plug cap is faulty***; replace it.

- or the ***HT coil has failed***. To test this, remove both plugs from the cylinder heads and trace the two thin wires (yellow for left and pink for right) back from the rear of the HT coils to the undersaddle area. Disconnect them both, and put the pink lead into the yellow circuit. Now try the left plug again, using a plug known to be good. If this produces a spark, then the right HT coil is faulty. Before replacing it, remember that the HT coils need a good earth connection with the frame, for them to work. Dismantle them from the frame and use a wire brush to clean up the bolt and locating areas. If the suspect coil works afterwards, it was just a bad earth connection; reassemble the HT coils, I recommend wrapping a shopping bag or cling film over them to keep out muck and dust.

> If the suspect coil still does not produce a spark, it should be replaced.

> If the right plug is firing but weakly (compare with the ok plug) you probably have an electrical leak somewhere between the CDI unit / transistorised ignition boxes, and the plugs. Trace the wiring carefully, looking for chafing or corrosion, and clean up / reinsulate where necessary.

The engine starts ok and runs on both cylinders, but there is misfiring or power loss ("engine bogging")

There are several common faults:-

> ***Poor fuel***, fuel contamination with rust or water, accumulated dirt in the tank etc. Swill out or replace the tank; fit an inline fuel filter, which is a small plastic case inserted in the run of the fuel pipe between the tank and the carburettors. This only costs a pound or so, and is dead easy to fit. It's a good idea to swill out your tank once or twice a year, using a 50/50 mixture of petrol and engine oil, which will pick up dirt or rust flakes, and general debris.

> ***Stator failure*** is diagnosed **here.** Low circuit failure results in very poor performance below about 5,500 rpm. The more common high (blue wire) circuit failure results in very poor performance above 5,500 rpm. The stator page gives several places which rewind stators; I can personally recommend ***West Country Windings***.

> ***Faulty ignition coil***. Having had the dreaded 5,500 - 6,000 rpm misfire, where the engine bogs down, I checked the stator voltages and found they were at the minimum. So I had a spare stator professionally rewound, and fitted it. The engine performance was very much improved, until the misfiring returned a few days later and I had to replace both coils in the space of a few days. I think that the old coils were simply at the end of their lives, and gave up when the new stator threw full voltage at them!

> ***Bad contacts***. Remove the saddle and disconnect all the multi way connectors, also those inside the headlamp area. Use a fine wire brush to reach into both the male and female halves, to remove dust, dirt, any corrosion, etc. Afterwards spray with WD40 and wrap the connections in cling film or a shopping bag. Pictures of these components are on the stator page.

> **Decoking** may be necessary at around the 40,000 mile mark.

> ***Dirty sparking plugs***. Cean them with a wire brush, and set the gaps as per **this** page. I've found performance diferences between the NGK ***D8EAs*** and the ***DR8ESLs***. It's a marginal difference, but it did help a misfire at about the 5,500 rpm band.

Edvard Korsbæk adds:-

"My bike ran extremly poorly from 4500 RPM, and was next to impossible to get over 4500 RPM. If it ran over 6000, it begins again, and ends at about 8000 RPM. It started immediately, and ran well until the 4500 RPM limit. Check with a stroboscobe showed missing sparks under load - without load it spins freely. The reason was that shortly after Spring, I had an accident, and was down. The air filter was clogged with engine oil - which was impossible to see, and the filter was less than

1,500 km old."

You are welcome to **comment** on these pages.

CX500 / GL500 / CX650 / GL650 Carburettor Remove / Refit

Skill levels explained.

Skill Level : 2. **Dirty Level** : 1. **Work Mess Level** : 1. **Tools level :** 1 : 8mm, 12mm, 14mm, 17mm ring and socket spanners; T-handled screwdriver; WD40; ratchet and extension bar; **torque wrench**. **Space required** : 1

Time : *expert* 15 minutes, *average* 20 minutes, *"first-time"* 30 minutes.

All the hands, tools, and bike in the photos are the author's. In some of the photos I have had to wipe my hands clean before using the camera.

All nuts and bolts are described in the spanner size required to fit them.

This page will show you how to remove and refit the carburettors on your CX500, GL500, CX650 or GL650. Typically this is part of the engine removal process, to fit exchange carburettors, or remove them for examination and servicing.

All bolt sizes are quoted as the spanner size required to fit them.

I am very receptive to comments and suggestions, but you use these pages entirely at your own risk.

Removal Procedure

Place the bike on its centre stand on a firm surface and turn off the ignition. As you will be dealing with petrol, don't smoke or use any naked flame during this procedure. Either drain the carburettors by undoing the small drain screws at the bottom of each one, or run the engine with the fuel turned off, until the engine stops. Then allow the engine to cool down.

Turn off the fuel supply and disconnect the fuel pipe from the petrol tank (right) to the LH carburettor. My bike has a manual fuel tap with only one pipe, but variants with a vacuum operated tap will have two pipes.

Remove the saddle. My bike has two spring loaded catches at each underside of the rearmost part of the saddle; other models may be different, and require the saddle to be unbolted.

Remove the 12mm head bolt securing the petrol tank (*right*), and lift off the tank. Some variants have the tank bolted at two points right at the front. Place the tank outside and away from any potential source of heat, flame or electrical spark. Particularly, if you are working in a shed or garage, do not place it at your only means of exit. If there is a fire, you won't be able to escape. I have scars to prove it.

Whenever you remove the tank, swish the fuel round to stop any muck accumulating in the bottom section.

Remove both the side panels. These pull off from the bottom, and then lift upwards. Upturned, they make a good place to keep nuts and bolts, so you don't lose any.

Fully slacken (there is no need to remove) all four circlips from the carburettors. These are located, on each carburettor, where the soft rubber hose from the airbox joins the rear of the carb (*right*), and at the front of the carb where it joins the inlet tract.

The 500 Eurosport amd all the 650s have the carbs mounted more centrally than the ZABC type shown here, but the removal tecnique is the same.

On my bike I have replaced the slender Honda black circlips with ordinary wider Jubilee type clamps, bought from Halfords.

Remove the two 8mm bolts which secure the inlet tract to the right hand side cylinder head (*left*) The easy way to remove the tract is to loosen the circlips at the carburettor end, and then gently rotate the tract around the carb so that the alloy end moves away from the inlet manifold.

The off-set angle of the inlet tract means that as the tract rotates, the gap between tract and inlet manifold increases, and leaves much more space to ease the rubber end off the carburettor stub. Don't lose the black rubber O ring which seals between the tract and the head.

Repeat, removing the left hand inlet tract.

(Notice the brown insulating tape I used to try and track down an elusive carburettor fault. It did not help, so I removed this tape during the work session.)

If your bike has the thick black soft rubber engine breather pipe connected at the cylinder head (left), pull off the holding circlip and the pipe, and fold it out of the way.

Store the two inlet tracts, the four bolts and 2 O rings (*right*) safely. If the O rings show any signs of damage, replace them.

For cosmetic purposes, it's a good idea to give the outsides of these inlet tracts a good scrub and clean whilst you have them removed from the engine.

Also examine the hard rubber part of the tracts for cracks or damage. A temporary repair can be effected by wrapping with black insulating tape, but really the part should be replaced if there is any damage.

Slacken off the locknut for the choke cable (*left*) ...

... and slip the metal collar end of the cable out of the clamp (*right*).

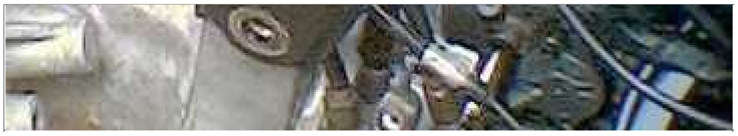
Then reach around the back of the carbs to where the extreme end of the choke cable joins the mechanism, and slide the barrel-shaped nipple out of its shaped recess. Lift the cable clear of the working area.

For the ZABC models, slacken the large 14mm nut at the bottom the V-shaped engine mounting plate (*left*). This is located directly above and forward of the carburettors.

You will probably need a spanner at each end of it, but remove the long bolt (*right*).

Eurosport 500s and all 650s don't have this mounting bracket and bolts.

Slacken and remove the top two 12mm holding nuts for the V-shaped plate (*right*).



If the bolts are pushed in from the right hand side, there is no need to remove them - just push them clear of the left hand plate, freeing it. If the bolts haven't been removed before, it's a good idea to take them right out, then clean and grease them.

If the bolts are inserted from the left, remove them completely. Clean and grease them and replace them from the right hand side, leaving the left hand V plate free to move.

Store the nuts safely.

Trace the thin yellow electrical lead from the left hand ignition coil (the large black barrel-shaped device) backwards to where it plugs into a bullet connector under the saddle, and disconnect it. Pivot the left hand V plate on its frontmost bolt, and lift the ignition coil and V plate upwards (*left*) to clear the working area.

The carburettors are still attached (*right*) to the throttle cables, and pull out towards the left. They are a tight fit between the engine and the rear part of the main spar and you will probably have to work them around the main electrical harness.

Note that some petrol will almost certainly leak out at this point. Be careful of fire.

A good place to position to the carbs whilst you disconnect the throttle cables is on top of the main spar, just forward of where the petrol tank holding bolt screws in.

As you have just disconnected the choke cable, observe the choke butterflies at rest (fully open).

There are some differences in carb models so don't worry if yours don't look exactly like mine.

Slacken the locknut (*left*) which secures the rearmost of the two throttle cables to the carburettor body ...

... and disconnect the cable from its location (*right*) on the actuating mechanism. Mark it "R" for rearmost, or tie a label to it. This will save you trouble later on.

It is the rearmost cable which opens the throttles. The actuating mechanism is spring loaded to close automatically if the twistgrip is released, but for safety reasons, the throttle also has a close (frontmost) cable.

So if the closing spring fails, you can still throttle back by operating the twistgrip.

Turn the carbs over. Slacken the locknuts (*left*) which hold the other cable to its bracket, and disconnect the cable from the bracket. Now disconnect the cable end from actuating mechanism.

This one is rather fiddly to get at - on the photo (*right*), I've circled the cable nipple end as it has just been removed from the actuating mechanism.

Once the frontmost throttle cable is disconnected (*left*), The carburettors should now lift completely clear.

Refitting Procedure

This is a straightforward reversal of the removal. However the following points will prove useful.

When adjusting the throttle cable locknuts, allow 2-3mm free play on the cable. In other words there should be a slight amount of free movement at the twistgrip before anything moves on the carburettor actuating mechanism.

Ensure the twistgrip throttle is completely closed (idle speed position) before reattaching the rearmost cable.

Ensure the twistgrip throttle is completely open (full power position) before reattaching the frontmost cable.

Ensure the choke pull lever is completely closed (normal warm running position) before reattaching the choke cable. Again allow 2-3 mm free play when retightening the clamp.

Clean and grease all nuts and bolts before reassembly - they'll come out easily next time.

When replacing the carbs, slide the choke ends into the soft rubber hoses from the airbox *before* fitting the inlet tracts. There is quite a lot of squashy play in the soft hoses which gives you valuable manoeuvring room at the inlet tract end. Get all 4 carburettor ends securely located before you tighten the circlips.

Torque wrench settings for the engine bolts are at the bottom of this linked page.

If you forget to replace the big circlips before reinstalling the carbs, don't worry, you don't need to remove the carbs again. Just fully unscrew the circlips and separate them so that you can slip them over the airbox pipes or the inlet tracts, and then reconnect them again.

After reassembly and refitting, check that the throttle cables operate freely and correctly at the twistgrip, and that the choke cable also works as it should. ***DON'T FIND THIS OUT ON A ROAD TEST!***

If all is in order, give the linkages and between-carbs area a good squirt with light lubrication oil.

Don't forget to reconnect the left hand coil ignition lead! It's the yellow one.

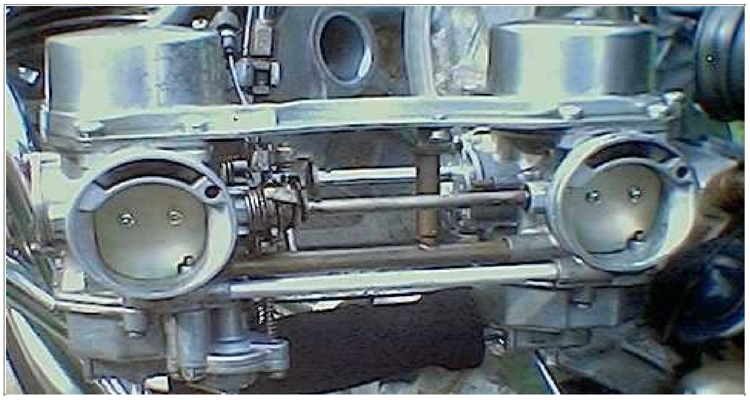
Additional pictures

Rear view of carburettors, with choke butterflies at rest (i.e. open).

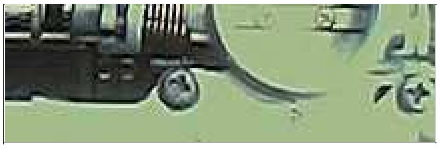
On this model of carb, the fuel transfer pipe is at the rear. It's the shiny pipe right at the bottom of the assembly.

Some carbs have this pipe at the front.

Rear view of the carbs, with the choke fully closed for a cold start (i.e. the handlebar choke lever pulled fully out). Note that these carburettors have the accelerator pump underneath the left hand carb. Not all carbs have this pump, which is designed to give better acceleration.



Sorry! the sun caught this one. Front view of carbs with the twistgrip fully relaxed, engine at idle speed (*left*) with the closing cable correctly refitted.



Front view of carbs (*right*) at maximum throttle, i.e. butterflies fully open.

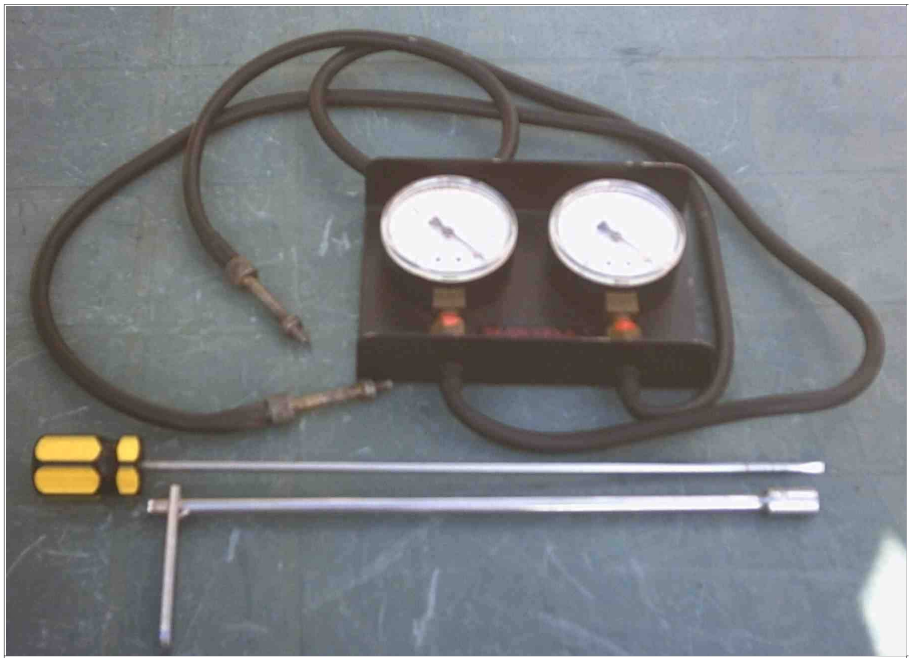
You are welcome to **comment** on these pages.

CX / GL 500 / 650 Carburettors balance

Skill levels explained. This page does not apply to Turbo models.

All nut and bolt sizes are given for the spanner size required to fit them.

Skill Level : 2. **Dirty Level** : 1. **Work Mess Level** : 1. **Tools level :** 1 : 8mm (plus 12mm, 14mm for Z, A, B, C owners) ring and socket spanners; T-handled screwdriver; ratchet and extension bar; vacuum gauges. Long thin screwdriver.



My vacs are trusty old **Davida** ones - highly recommended - they are about 25 years old and still work perfectly.

It helps a great deal if the special tool (in the lower part of the picture) is used. This isn't essential, but very much recommended. It consists of an 8mm long-shanked socket spanner which is hollow and allows a long-bladed very thin screwdriver to pass down it.

Space required : 1

Time : *expert* 20 minutes, *average* 30 minutes, *"first-time"* 45 minutes.

All the hands, tools, and bike in the photos are the author's. In some of the photos I have had to wipe my hands clean before using the camera.

This page will show you how to balance the carburettors on your CX or GL. This can be done any time you like.

I am very receptive to comments and suggestions, but you use these pages entirely at your own risk.

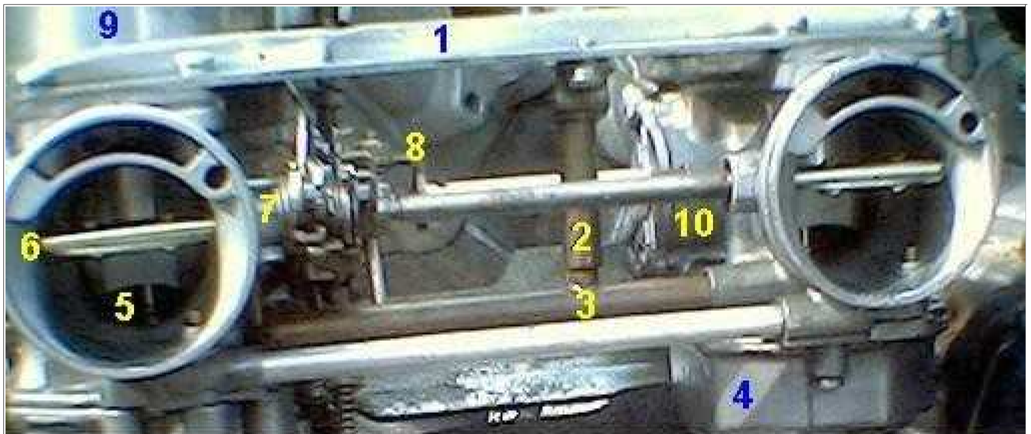
What is this procedure and why do I need to do it?

This help page does not apply to Turbo models.

Let's begin by looking at what the carburettors actually do and how they work.

Fuel from the fuel tank drops under gravity down the fuel pipe and then along a short transfer pipe which feeds both carbs. Each carb has a small chamber or reservoir on its underside, which works rather like a toilet cistern. It stores a small amount of fuel ready for use, and as the engine runs and uses up this small reservoir, a float in the chamber drops as the fuel level drops, opening a small valve which allows more fuel back in. As this is used up, the fuel level drops again and opens the valve. This reservoir is called the **float chamber** or the **float bowl**.

One common reason for carbs to leak fuel is when this tiny float valve either sticks open, or is jammed open by a small piece of rust or debris.



1 - carburettor mounting bracket. 2 - fuel feed from petrol tank. 3 - cross-feed to carburettors. 4 - accelerator pump (US models). 5 - piston, with needle just visible inside the venturi. 6 - throttle butterfly valve. 7 - operating mechanism from twistgrip. 8 - mechanical throttle link to opposite carburettor. 9 - vacuum top chamber
10 - just visible is the vacuum diaphragm housing.

View (left) of the carburettors is from the rear of the engine.

(There is no significance to the different coloured numbers - some yellow ones didn't show up well against the background, so I used blue in some cases.)

As you open the throttle, the cables pull on a spring loaded lever which, on each carb, opens a circular valve, called a **butterfly valve**, between the carb and the cylinder inlet. This valve is actually a slim circular plate, hinged across the middle, and when closed by the spring, blocks off the passage between the carb and the engine.

As the butterfly valve opens and the engine starts to suck in more fuel, a vacuum develops inside the carburettor body. This space is called the **venturi**. The vacuum is transferred up small passages inside the carburettor body to the upper part of the carb where the low pressure pulls up against a **piston**, which is very lightly spring loaded in the opposite direction. As this piston rises up the body of the carb, a long slender and tapered **needle** attached to its underside is also raised. The bottom end of the tapered needle is inserted into a brass plug with a hole in its centre. This is called the **jet** and the underside of it is immersed in fuel inside the float chamber. As the tapered needle rises, pulled up with the piston, the jet hole gets bigger.

The vacuum in the venturi sucks up fuel from the float chamber and this fuel passes up the jet aperture and sprays into the venturi. At the rearmost part of the carb is the large intake tract which is attached to the airbox and the air filter inside it. The spraying fuel is vapourised in the rush of incoming air (like an aerosol spray) and sucked past the open butterfly valve into the engine, where it is burned by the sparking plug.

When you close or reduce the throttle, the throttle return spring closes the butterfly valves, shutting off some or all of the fuel/air mixture, the vacuum in the venturi decays, the pistons are pushed back down by their light springs, and the tapered needle is lowered back into the jet, reducing the size of the jet aperture and thus reducing the amount of fuel which the engine can suck in.

Cast into the left side of each carb body is a small device known as an air enrichment valve. This consists of a small chamber with one passageway feeding fuel straight through to the inlet tract. This passageway is normally shut off and blocked by a rubber diaphragm, pushed into the passageway by a coil spring. However, when the throttle is shut off, vacuum in the inlet tract sucks open these diaphragms and allows neat fuel into the engine. This prevents popping and backfiring. These rubber diaphragms tend to either perish, crack, or degrade, especially if the bike is stored for long periods. This is easily fixed by removing the two tiny screws which hold on the covering plate, and replacing the diaphragm, spring, and tiny washer. The screws on the right hand carburettor face inwards and can be just about reached with a long, thin screwdriver.

There is a pair of brass jets facing each other across the divide between the two carburettor bodies. These look as if they should be connected, but in fact they aren't. They are just vents, and if you tip the carbs over they might leak petrol.

Ok so far? You'll see that there are two carburettors doing this, and like a cart with two horses, unless both horses are pulling with equal strength, the cart won't get maximum performance. If the left hand horse pulls harder than the right hand horse, one has an easy time and the other one works too hard. With carbs, they should be working in ***exact*** synchronisation, both delivering ***exactly*** the same amount of fuel/air mixture at ***exactly*** the same time.

Balancing the carbs means testing the amount of work each carb is doing and adjusting them so that they work as a perfect pair.

Symptoms of unsynchronised or unbalanced carburettors

1 ***Poor or erratic idle speed***. A fully warmed CX or GL engine should normally idle at 1,100 rpm and idle quite comfortably and without any hunting (idle speed rising and falling by itself) at 1,000 rpm. A properly balanced warm engine will idle as low as 600 rpm, and how low this will actually go before the engine stalls is a very good test of how well the carbs are balanced. If your engine won't idle cleanly at 900 rpm, then the carbs are out of synchronisation.

2 ***Poor fuel consumption***. Assuming a 500cc with a standard exhaust, anything consistently less than 50 mpg (Imperial gallons, 8 pints) suggests either that you are riding too hard or that the carbs are out of synch.

3 ***Poor performance***. There are several reasons why performance might be down and this is just one of them.

Popping or backfiring, especially on the over-run, is not usually caused by unbalanced carbs; but synchronising them is part of the cure. Details of this cure are at the end of the article.

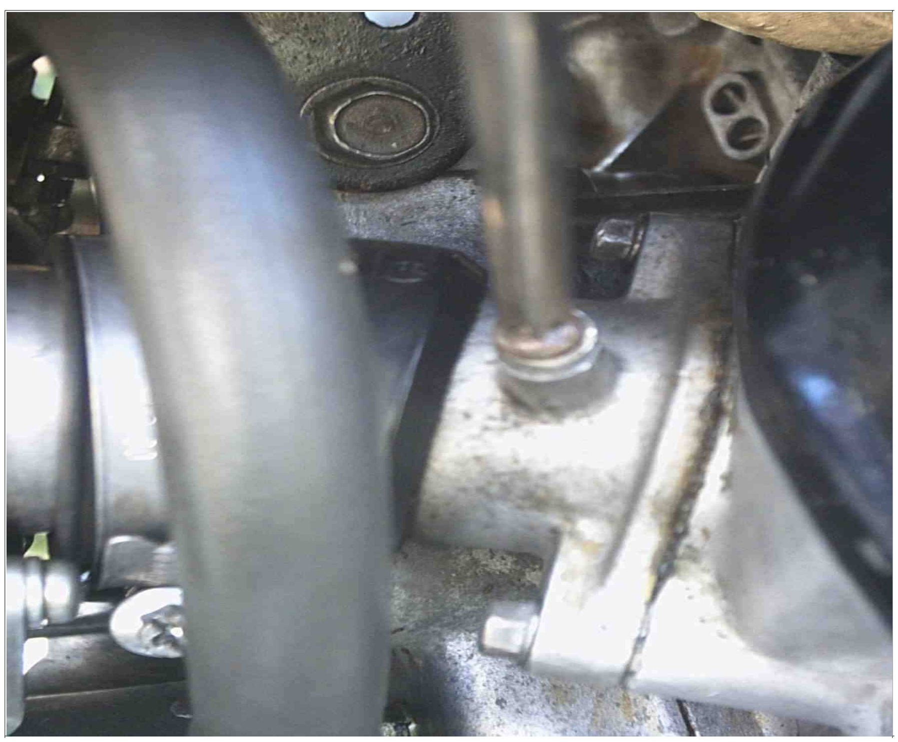
Procedure

In order to see how much work each carb is doing, you need to measure the amount of vacuum inside each of the inlet tracts, as the degree of "suck" here is dictated by the carburettor mechanism. This requires a pair of vacuum gauges (left). These can be an expensive purchase, but a good set will last you a lifetime.

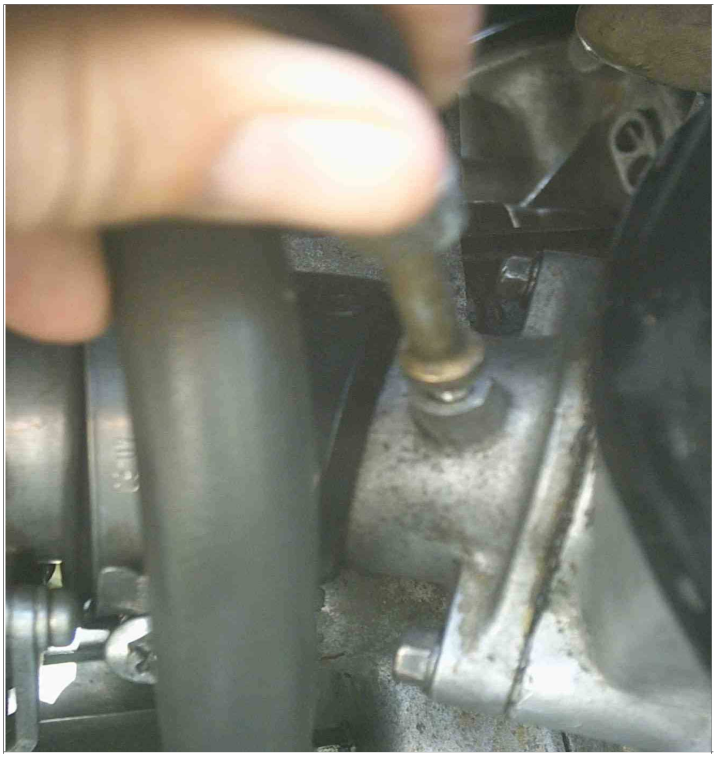
You cannot balance the carbs without vacuum gauges.

Firstly, warm the engine to the normal operating temperature.

On each inlet tract, remove the small screw and washer which closes off the vacuum ports.



Fit the adapters into the opened ports and



screw them finger-tight.

Run the engine and allow it to idle at 1,100 rpm. Check the readings on the vacuum gauges. It does not matter what they are, as long as they are exactly - ***and I mean, EXACTLY*** - the same. Even a needle width's difference will require adjustment. On the photo here, the two cylinders are ***well*** out of synch.

If they are precisely in synch, you're in luck. Remove the gauges, replace the port screws, you're done.

Usually, they aren't. Read on.

A Balancing Act

Although the two carbs are expected to work as a matched pair, the throttle cable only operates on the left hand carb. The other one is linked to the mechanism by a spring loaded bar which is retained against the other carb's mechanism by a tiny adjusting screw and locknut. Twiddling this screw makes minuscule adjustments in the way the left mechanism sits in relation to the right mechanism.

This linkage is not under any great force, and you'd think that once it was set up, it'd never need re-adjusting. However, factors such as inlet and exhaust valve wear, piston and fuel jet wear, general engine deterioration, and how many munchies the cat had for breakfast means that as the 1000s of miles go by, the carbs gradually drop out of tune with one another.

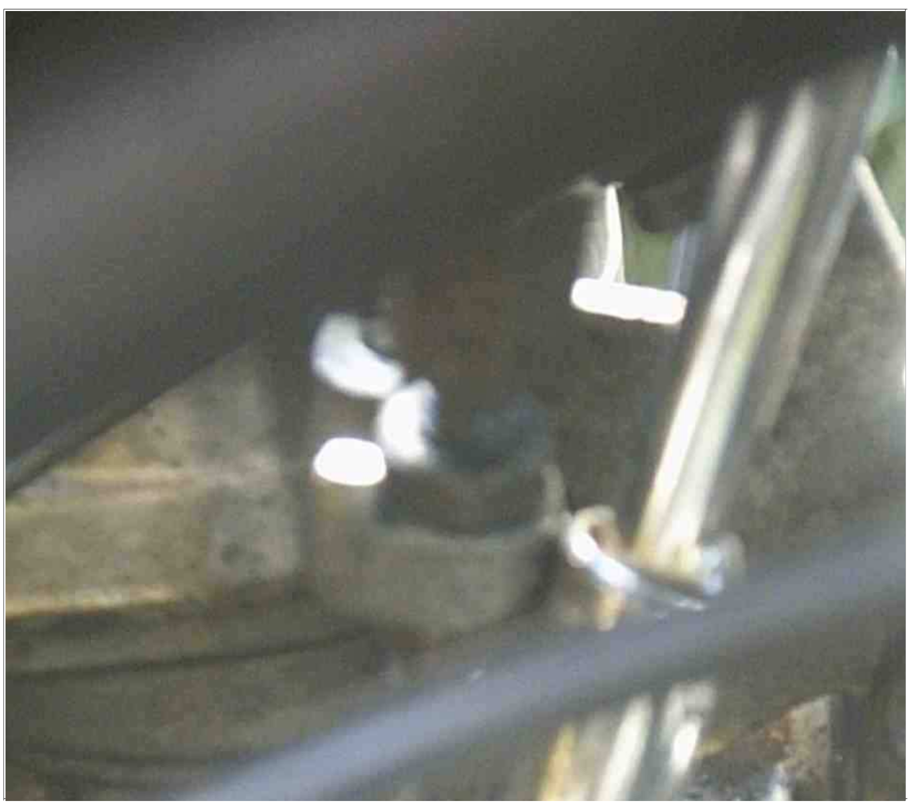
The tricky part is that the screw and locknut are tough to get at because the frame is in the way. So the task of adjusting the screw and re-tightening the locknut without disturbing the adjusting screw is a bit of an art, and can be frustrating. The good news is that GL and Eurosport 500, and all 650 owners have it much easier than Z, A, B or C owners. Either way, make sure the carbs have a full fill of fuel, or rig up a temporary fuel supply (beware of fire).

Stop the engine and remove the petrol tank and saddle.

If you have a Z, A, B or C, remove the 2 x 12mm and single 14mm bolts and then the left hand triangle plate directly in front of the carburettors, loosen the 10mm bolt holding the left hand coil to the main spar and swing the coil upwards out of the way. Don't disconnect it from either the sparking plug or the CDI unit. You will see that the main spar seriously impedes access to the between-carburettor area.

GL and Eurosport 500, and all 650 owners, you will see that the triple spar gives excellent access to the between-carburettor area!

Locate the carburettor actuating mechanism. If you can't spot it, twist the throttle and you'll see it at once.



I've left this picture large so that you can see how the mechanism is adjusted. Note that each carb has a small brass nozzle with tiny holes in. These two nozzles face each other and look as if they should be connected to something, but they are just vents.

If you don't have the special tool, use an 8mm ring spanner to loosen the locknut. You may have to break off a splodge of locking solution or yellow paint, this is ok. Reach in from above and locate the screwdriver through the ring spanner and onto the adjusting screw.

The special tool makes this much easier, as you see from

the picture. In either case, when adjusting the linkage, don't push downwards. There is a small spring which acts as a cushion in the mechanism, and a downwards pressure on the the adjusting screw will give a false reading.

Now start the engine and allow it to idle. Whilst closely watching the vacuum gauges, tweak the adjusting screw 1/16 of a turn.

If the ***left*** cylinder is reading ***higher*** than the right cylinder, ***unscrew*** (anti clockwise) the adjusting screw.

If the ***left*** cylinder is reading ***lower*** than the right cylinder, ***screw in*** (clockwise) the adjusting screw

When both gauges are ***PRECISELY*** the same, with no visible difference between the readings, tighten the locknut, taking great care not to move the adjusting screw.

Remove the tools and restart the engine.

You will probably have to make some allowance for the fact that tightening the locknut does in fact move things out of synch, no matter how careful you are in holding the screwdriver rigidly.

Be prepared to make several goes at this process - I'm warning you - it can take 5 minutes or an hour, but really it's definitely worth all the trouble. A well balanced engine sounds terrific, and purrs like a kitten when you trundle along at 30 mph in top gear - as well as idling easily and cleanly.

An extended adjustment session will mean that the carburettors are emptied of fuel. Rest the petrol tank on its mounts and reconnect the petrol supply temporarily, to allow the float chambers to refill. Then take the tank off again and continue your balancing act. If you can rig up a temporary fuel feed, this is a good idea, but don't spill petrol on the hot exhaust.

When the job is done, drop some silicon goo or locking compound on the locknut so that its can't vibrate loose. Remove your tools and replace any removed mounting plates, put back the tank and saddle, reconnect the fuel supply and replace the screws in the vacuum ports - don't forget the sealing washers.

Nigel Bird adds *"After getting the carbs in balance, blip the throttle. The carbs should settle back to the same balanced position. If they don't, check for air leaks at (a) head/inlet joint and (b) all jubilie clips (do not over thighten these as this will cause the inlet rubbers to split just in front of the moulding for the clip).*

"If this does not cure the problem, remove the carb tops and clean the piston and chamber. Then replace the piston in the top without the spring, and try to move from side to side. NO movement should be felt at all. Next, move to about 2 1/4 inches from the rim of the top, and try again. Any movement here means a loss of vacuum at idle, causing rough running at idle, and on part throttle the only cure is too replace the tops/piston sets."

Backfiring and Popping on the Over-run

This embarrassing problem is almost always caused by the mixture of fuel and air at idle speeds is either simply too lean - i.e. it does not have enough petrol, or too rich (too much petrol). This is easily addressed. On the underside of each carb body is either a small brass screw or a dull aluminium knob with a tiny tongue on it. If you have the accelerator pump under the left hand carb body, then you will not have the brass screw type of air jet. Screwing the pilot jets in (upwards) increases the amount of air, weakening the mixture; screwing them out (downwards) increases the amount of petrol, richening the mixture.

If you have the knobbly type, these are restricted to almost one turn of adjustment which is usually not enough to stop popping on the over-run. Here in the UK we don't have such draconian emission laws as in the US, so you follow these instructions at your own risk! In the US / Canada you may infringe your local or national emission laws.

If you have the knobbly type, use a hacksaw to remove a tiny piece of aluminium from the underside of the carburettor float bowl, so that the knobbly screw can be rotated without fouling the float bowl. Then dress the cut away edge with a fine file and use a fingertip of dirt to mark the metal and conceal the tiny surgery.

If you have the brass screws you need do nothing to free them up.

Warm the engine to normal temperature. It is best to balance the carbs first on vacuum gauges if you can. Stop the engine. Clean and reset the plugs. On each cylinder in turn, screw the air jet all the way in and then out by 2½ turns. Restart the engine and set the idle speed to 1,100 rpm on the large black knob under the carburettors.

Tweak the left hand air jet 1/8 of a turn each way until the engine revs are at the maximum you can get. Reset the idle speed back to 1,100 rpm.

Repeat with the right hand air jet.

Road test - cruise at 70 or 80 and shut the throttle sharply, allowing the engine to over-run for as long as you can - at least 5 seconds. A long downhill slope will help you a lot. You should only get a gentle bubbling noise, but you might get a popping. If this happens as soon as you shut off, adjust the jet screws by 1/8 of a turn and test again, until the popping stops. Some trial-and-error is called for, because engines and carbs differ a lot as they age.

Popping will probably still happen after a very long overrun, say down a long steep hill. This is normal.

If there is no popping, turn both jets out (screw downwards) by 1/8 of a turn until you get popping, then put them back in by 1/8 of a turn.

Paul Middleton says "I used a short length of 6mm reticulation tube which fits tightly over the knurled screws with a T on the end of each. Makes adjusting much easier especially one the move."

This procedure usually involves some experimentation but it's worth the trouble to get the motor sounding sweet.

You are welcome to **comment** on these pages.

CX/GL 500/650 Oil Pump Removal

This site will tell you how to remove the oil pump mechanism. I am very receptive to comments and suggestions but you use this information at your own risk.

Skill Levels explained.

Skill Level with engine out : 1. with engine in frame : 2. Personally dirty : 2. Work mess : 1. Tools : 1. Space : 1.

You don't need to remove the engine from the frame. In most of these pictures, Valiant's engine is removed, but it was out anyway, for other work to be done.

All nut and bolt sizes are given as the spanner size required to fit them.

Warm the engine and then drain the oil. It is not absolutely essential to **remove the radiator**, as you can get by with just lifting it out of the way after unbolting it, but really it's better to remove it. The front casing is much easier to remove if the radiator and fan are not in place.

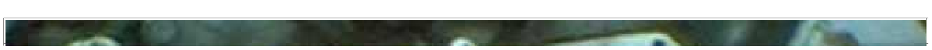
Disconnect the clutch cable at the clutch end. This is secured by two 10mm nuts; slacken them full off, use a pair of pliers to raise the clutch arm, and slide out the nipple (at the end of the cable) from the clutch arm.

Remove the 8mm head bolts which attach the front crankcase, and gently pry off the front cover. Don't use force, and especially don't use a screwdriver between the mating faces.

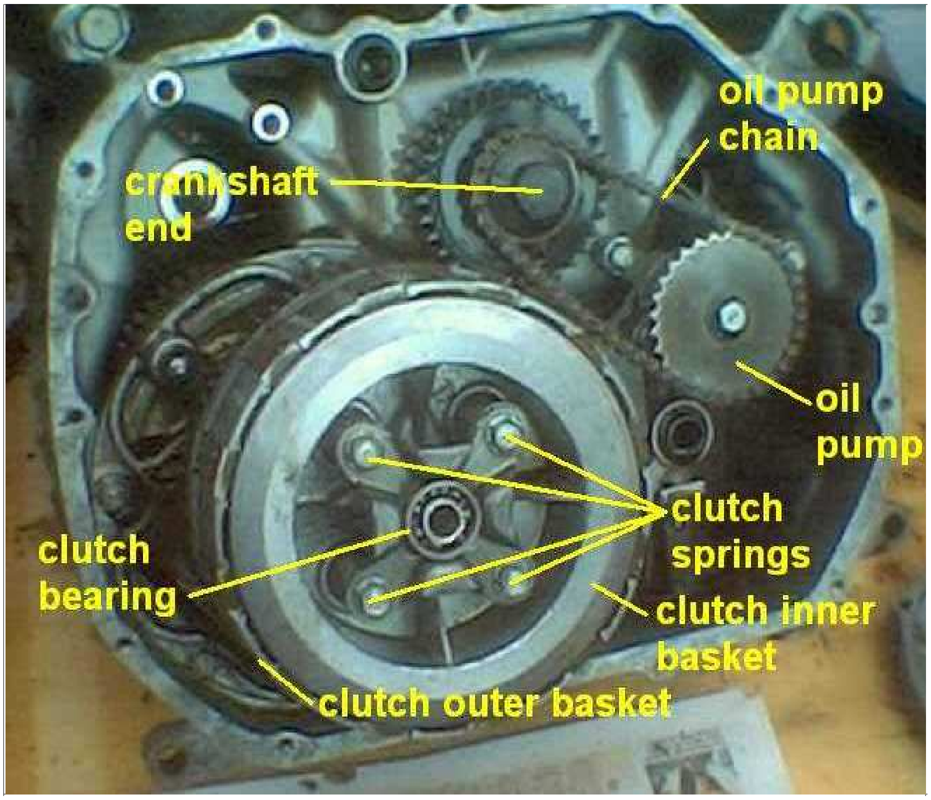
In the photo (right) the clutch cover has been taken off as well, but you needn't do this.

The bendy black tube is one of the oil feeds.

Carefully remove all traces of the old gasket.



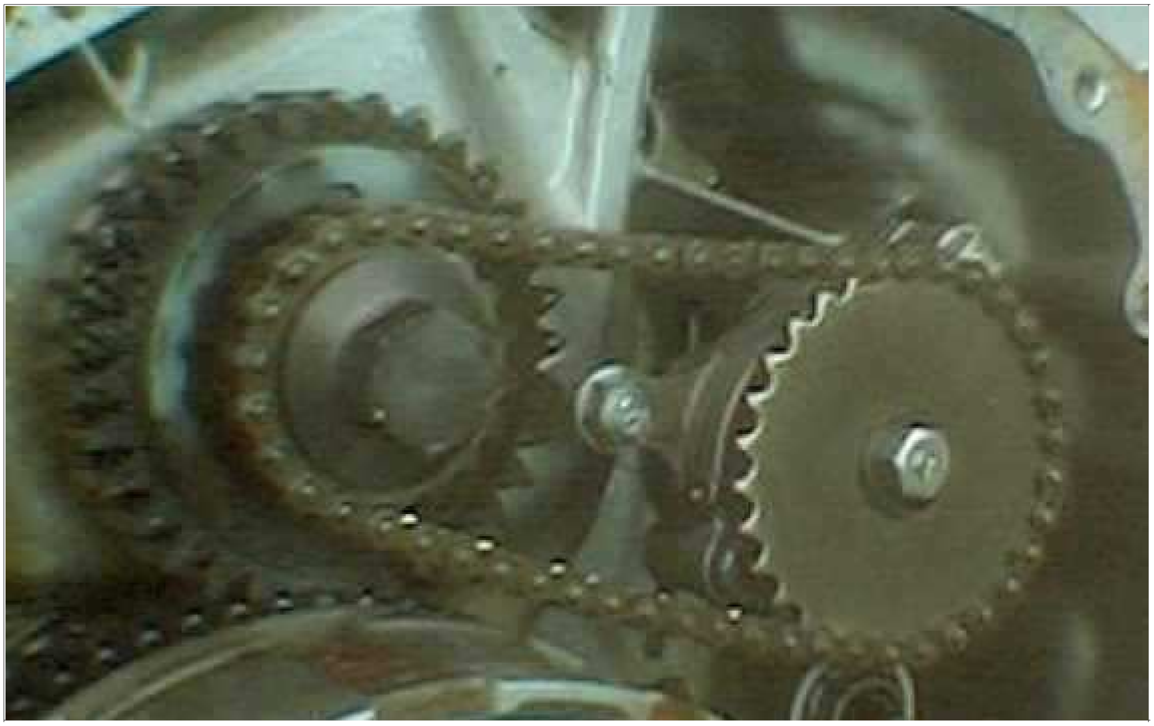
Inside the open engine (left).

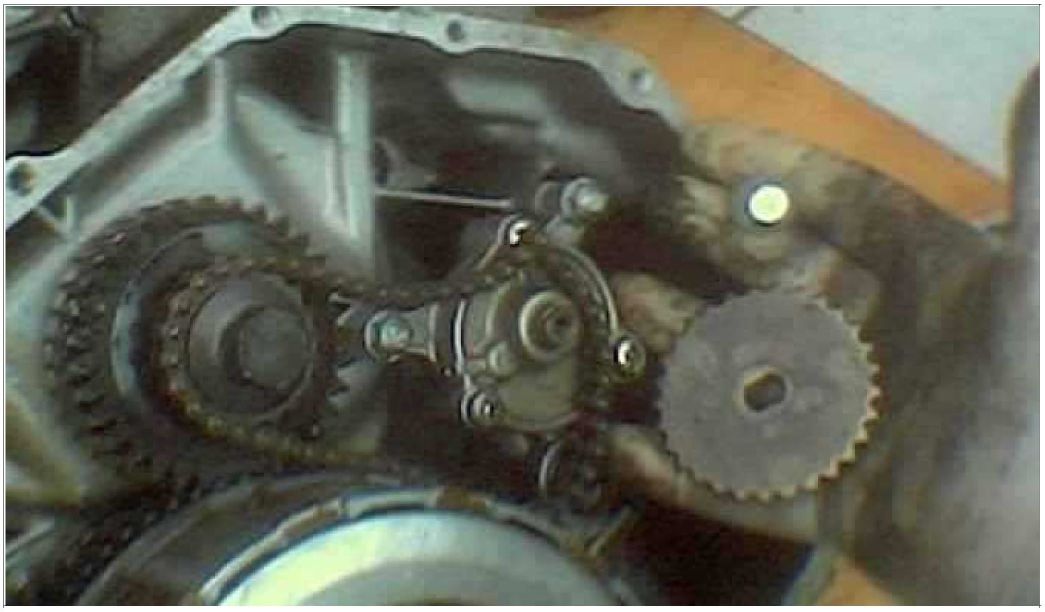


The oil pump itself is hidden behind the large shiny sprocket. This is driven by a chain directly from the crankshaft.

Close-up of the crankshaft end, the oil pump drive chain, its sprocket and you can just see the oil pump behind the sprocket.

The large outer pinion on the crankshaft is what drives the clutch outer basket. This drives the inner basket and that connects to the gearbox.





Remove the bolt which holds on the sprocket, and pull it off with the chain (left).

Unbolt the oil pump from the opened crankcase, and pull it off complete with its lower pipe and the metal strainer.

Frightening isn't it, what was caught on the strainer? Having upturned (left) the strainer, this is what I found. Tiny bits of metal, plus some slivers of gasket and sealing compound.

If you are not replacing the pump, wash off all

these bits in paraffin or petrol.

The oil pump chain is a continuous one and does not have a split link. If it shows sign of wear, or on reassembly it cannot be correctly tensioned, you should replace it.

The CX500 oil pumps are extremely simple in operation and correspondngly reliable; they often go to 100,000 miles without replacement. They are what's called trochoidal, which means that they work rather like a heart. An inner star-shaped steel rotor, with four arms, rotates inside an outer rotor with five corresponding cutouts. Oil is pumped between the chambers as the assembly rotates, and goes out into the oil passageways inside the engine.

I'd recommend changing the chain at 40,000 miles but the pump will be good for more than this. If you want to dismantle the pump itself, do so under surgically clean conditions. You can check the internal tolerances if you want to, but you'll probably need an impact driver to get the holding screws out. If you dismantle the pump, there should not be more than 39/1000ths clearance between the inner and outer rotors, and no more than 138/1000ths between the outer rotor and the body of the pump. On reassembly, note that the punch mark on the outer rotor faces outwards, you should be able to see it during reassembly.

Before reassembly, wash or wipe out the oil sump at the bottom of the crankcase area (left). You can see the dipstick poking through in the picture. Any sludge or muck shows neglect in changing the oil and filter.

A well maintained engine should be free of all deposits.

Reassembly is a simple process. Don't forget to renew the O-rings around the oil transfer passages. Ensure the 2 hollow dowels are in place; the one at the top (right) and the one between the oil pump body and the front casing.

Don't omit the oil jet and O-ring adjacent to the clutch (right).

Finally remember to replace the O-ring directly beneath the oil pump. This feeds into the curly pipe built into the front crankcase cover.

To correctly tension the chain, replace the oil pump on its mountings and insert the holding bolts not quite finger tight. Loop the chain over the crankshaft pinion and over the oil pump sprocket and locate the sprocket on the pump. It sits in a shaped slot on the oil pump's spindle. Insert the sprocket's locking bolt and tighten it to 6-9 ft lbs.

Now wiggle the pump on its mounting bolts so that there is no slack in the chain and tighten the bolts to 6 ft lbs. Check the chain again afterwards.

When replacing the front cover, I recommend using a gasket sealant like Hylomar, spread thinly onto both faces, with the actual gasket in between. Insert the 8mm head bolts and tighten finger tight, then in a diagonal sequence to not more than 6 ft lbs - they are easily stripped. Wipe off any excess sealant.

Tachometer (rev counter) drive

CXs sometimes develop an oil smear from the behind the radiator. This weep comes from a failed oil seal on the tachometer casing. It is easily replaced without removing the front cover, but you do need to **remove the radiator and fan**. You'll need a new oil seal and tacho casing gasket.

The tacho drive assembly is bolted over the front end of the camshaft, directly behind the radiator and directly above the crankshaft. It's held on with four bolts, and then the assembly can be gently prised off (left). Carefully remove all traces of the old gasket.

The leaking seal is the one which fits inside the tacho drive casing, over the end of the camshaft. Poke out the old seal and insert the new one, it goes with its closed end facing outwards, towards the fan. Before refitting the casing, smear a glob of grease over the camshaft's end. Then fit the new casing gasket, again with a sealant like Hylomar.

Tighten the four holding bolts back to 6-9 ft lbs.

I recommend changing the oil and filter after 500 miles.

You are welcome to **comment** on these pages.

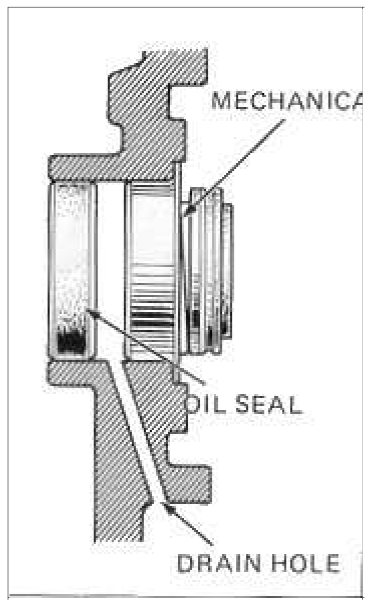
CX/GL 500/650 Removing & Replacing the Water Pump & Mechanical Seal

The Yamaha replacement mechanical water seal

The first section of this page describes the problem, and the Yamaha alternative seal. The second part covers how to change it and service the water pump / impeller.

NOTE that the Yamaha mechanical seal should not be used with the 27mm rear casing aperture (details further down).

HOWEVER a recent experiment showed that the Yamaha seal DOES fit the 650. Read the original message and its follow-up threads.



When your CX or GL starts weeping ominous brown (seriously old antifreeze) , green (the wrong kind of antifreeze) or pink (correct type of antifreeze) fluid, or engine oil, from the water pump area onto the top of the alternator casing, and then down the left hand side of the engine onto the H-box, you start to worry about all sorts of things being wrong. This leak is almost always caused by a special seal, called the mechanical water pump seal, having failed. This seal is located in the rear engine casing, behind the water pump impeller, and it prevents oil lubrication from the camshaft area (which drives the water pump) from mixing with the cooling fluid. When the seal starts to fail, it allows cooling fluid to escape from a small overflow hole.

However, if you have coolant leaking in this area, it might be something as simple as failure of the O-ring at the water pump end of the chrome water transfer pipe. This is easy to diagnose. Run the engine and shine a lamp into the area, watching carefully. If the mechanical seal is leaking, coolant comes out of a small drain hole directly under the water pump casing. A failed O-ring causes drips directly around and under the top end of the chrome pipe. If in doubt, stuff kitchen roll all round the area and see which part is wet. If it's a failed O-ring, remove the pipe (photos below) and change the O-ring. Read the part at the end of this article about one problem associated with the reassembly.

The weep might also be caused by a damaged or cracked coolant feed pipe. This is a slender rubber tube which runs across the top of the engine from the thermostat to a stubby pipe on the top of the water pump housing, being secured with a simple spring clip. The tip of the this hose at the water pump end can crumble or degrade, or the nasty spring clip can just wear out. Some kitchen roll stuffed around this area will easily show a leak - if this is the culprit, and there is slack on the pipe, cut off the last 1/2 inch and secure the fresh end to the stubby pipe with a proper Jubilee clip. Or, replace the pipe.

Another weep cause can be that the dome nut which retains the water pump impeller has become detached. This can be easily seen once the water pump cover is removed, and is fixed without dropping the engine.

The mechanical seal is in three parts

(left). A rubber seal and base, which locates into a recess in the rear (flat) face of the water pump impeller; a ceramic seal like a large Polo Mint that abuts to it, and a shaped metal seal which locates into the hole where the camshaft pokes through, and which is spring-loaded against the ceramic washer. The ceramic washer turns with the water impeller - but the spring loaded part doesn't. So, wear and eventually leakage between these two components is inevitable.

Note that the metal thrust washer which fits between the flat face of the impeller and the camshaft is shown here still in place on the end of the camshaft, just below the ribbing.

It is this weeping that causes the wet leak. Fortunately, failure is usually slow, allowing plenty of time for the problem to be addressed; and no harm is done unless the water loss is enough to lower the level in the radiator. You can ride home provided that you keep topping up the radiator, and you don't let the temperature gauge go over 80%, or into the red. Remember that you should not remove a hot radiator cap without a thick rag over it, as when the radiator pressure is relieved, the remaining water boils instantly and squirts very powerfully out of the filler cap. You can sustain serious scalds. If in doubt, wait until the engine has cooled.

So, is the solution a straightforward fix? Well, ***yes*** and ***no***.

No, because:-

(1) the mechanical seal is what's called an ***interference fit*** in the crankcase.

An ***interference fit*** means that the rear engine casing must be stripped bare and then heated to at least 150C to expand it. This allows the seal to be very carefully driven in. The actual seals are both ceramic and particularly fragile. Most of us wait until the wife is out, and then put the degreased rear casing first in the dishwasher and then in the domestic oven.

(2) whilst you can theoretically get at, and change, the seal without removing the engine, in practice this is so difficult (through lack of space) that the time lost in removing the engine is easily won back again. Also, more importantly, leaving the engine in the frame does not allow you to replace the inner oil seal, which should be changed at the same time.

and

(3) a recent mechanical seal change job went off the rails when we discovered that there are two subtly different models of rear crankcase cover fitted to the CX and GL engines. Whilst some crankcases have the 28.3mm aperture, some engines have the smaller 27.8mm size.

27.8mm or 28.3mm mechanical seal aperture?

It has proved impossible to determine which models have which sized aperture, due to the fact that so many bikes have had entire engine or rear case transplants.

After a great deal of discussion with fellow spannermen, I have to advise readers of this page not to use the Yamaha seal with the 27mm aperture. Most attempts have failed, and if you have the smaller aperture, the Yamaha seal being a mere 0.7mm more in diameter than the Honda one, is just too big to be persuaded to fit.

The Yamaha seal is fine with the 28mm aperture and the Honda mechanical seal fits either size.

The Honda mechanical seal I bought in May 2005, for a CX500A, measures 1.129" (28.66 mm) in diameter and its Polo Mint was 0.905" (22.99mm) diameter, 0.156" (3.95mm) thick. Without compressing the spring, the seal was 0.634" (16.11mm) deep. The inner diameter, measure at the metal end which goes into the aperture, was 0.5635" (14.32mm).

The Yamaha "Polo Mint" ceramic seal, which sits in the rear of the impeller, is 0.9035" (22.95 mm) in diameter, and is 0.156" (3.96 mm) thick.

It is suggested that you scribe "27mm" or "28mm" on your rear casing, once you know the aperture size.

You have to remove the engine and rear crankcase to do this job. But you don't need any special tools (you're not ***forced*** to remove the alternator rotor). All the same, it's an ideal time to pop off the alternator rotor and check the camchain tensioning apparatus, alternator stator and water pump, whilst you are in there. Especially if the cam chain and/or tensioner have done more than 20,000 miles - I strongly recommend that you change the chain and tensioner blades, whether the manually adjusted (all 500s except Eurosport) or automatic (late model GL500s, all 500 Eurosports and all 650s).

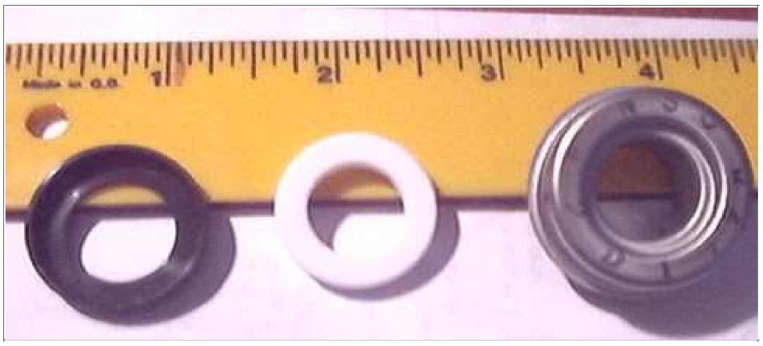
This is the top part of the rear crankcase (left) after removal from the engine, seen from the outside, and with the water pump impeller removed. The snake-like passages are where the coolant is pumped out to the cylinder heads, and the central hole is where the end of the camshaft sticks through. It is to the end of the camshaft that the impeller is bolted, and between the two goes the mechanical seal.

This is the Yamaha mechanical seal, part number ***11H-12438-10*** (right) in its three component parts. The ruler is in inches. From left to right, the rubber base which sits in a recess in the rear (flat) face of the water pump; the "Polo Mint" ceramic washer; and the mechanical

seal body.

This view would be from the ***water pump impeller*** end.

If you unthinkingly separate the rubber base from the ceramic seal, note that the blue flash on the ceramic seal faces outwards, towards the rear of the impeller and towards the rear wheel.

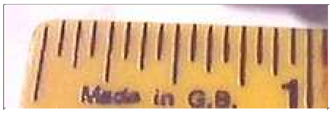


The same view (left) but the opposite sides of the items. Note the orientation of the ceramic seal, with the blue flash not visible.

This view would be from the ***camshaft*** end.

Mechanical seal - the face that locates against the ceramic seal which sits on the flat face of the water impeller. From this angle you can't see the spring loaded part of the seal.

The mechanical seal edge-on. Here, you can see the spring loaded mechanism. The blue band is a built-in sealing compound.



A close-up of the mechanical seal's face which is pushed into the camshaft aperture, towards the inside of the engine.

The mechanical seal placed, but not inserted, into the camshaft aperture.

Where can I buy this Yamaha item?

Any Yamaha dealer! I bought my two seals mail-order from:-

Fowler's Motorcycles, Retail Mail Order Dept., 2-12 Bath Road, Bristol, Avon UK BS4 3DR. 0117 977 0466. The total price for ***two*** seals including postage and VAT was £21.97.

Part number 11H-12438-10.

David Silver quotes £20 + postage and VAT (approx £23) for the genuine Honda mechanical seal.

Servicing the water pump, impeller, and changing the mechanical seal

Skill Levels explained.

Skill Level : 3a. Personally dirty : 3a. Work mess : 3a. Tools : 3a. Space : 2.

All nut and bolt sizes are given for the spanner size required to fit them.

Engine out - or not?

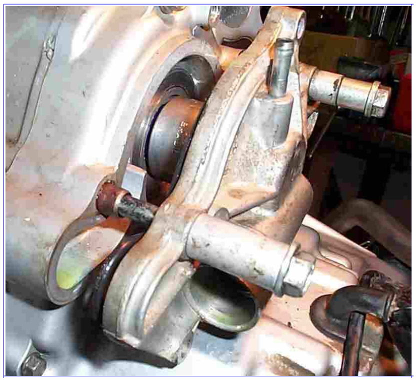
If you have coolant weeping from the drain hole under the water pump casing, there are two things you can try before delving deeply inside the engine. Firstly, remove the water pump casing and the impeller and simply replace the ceramic seal, its rubber boot, and thrust washer, the brass washer and the dome nut. You will still have to buy a complete mechanical seal etc but you can change these parts easily ***without*** any major work, and ***without*** dropping the engine. Secondly, when you reassemble the water pump, replace the O-rings in the water pump casing and torque the impeller dome nut and the casing bolts to a little more than the lowest setting. However if these ideas don't work, you will have to do a full mechanical seal replacement.

If you have engine oil weeping out, there is only one solution - drop the engine and change the oil and mechanical seals.

Removing the old mechanical seal is straightforward enough even without dropping the engine. I managed to get the old seal out, but there was some minor damage to the lip of the casing where the seal fits. The problem was simply that the seal, especially the Yamaha one, is such a tight fit in the aperture that I'd say that it's next to impossible to replace it successfully without dropping the engine.

I know from correspondence with other owners that it ***has*** been done. I tried it, and wrecked one seal, after that I didn't feel inclined to try again, and did it the proper way. Sorry-and-all-that, but with this job I strongly advise you to bite the bullet and drop the engine.

The main disadvantage with not removing the engine and rear casing is that you can't get to the camshaft rear oil seal. which should be replaced at the same time as the mechanical seal.



Jason Wright says *"I installed two Honda mechanical seals in an '81 GL500, screwed them both up, and to my delight, the local shops had the Yamaha seal in for half the price. I have included a few pix of how i installed the last seal, without pulling the engine, it worked excellently, no leaks. The first two seals, I had the engine out for, but by leaving the case on the motor, the shaft on the end of the cam works as a guide. I would recommend using a spare impeller cover if one can in case it cracks. It needs to be torqued until slightly snugged."*

However ... I still don't recommend attempting this job with the rear cover in place.

DO NOT USE A BLOWLAMP TO HEAT THE SEAL AREA - THIS CAN WARP THE REAR CASING AND CAUSE FATAL DAMAGE.

Have at least one new mechanical seal, one oil seal, and a rear-end gasket set with O-rings, ready. You will also need access to a domestic oven and a 28mm socket spanner, or comparably sized metal drift.

This page will work on the basis that you are working with the engine out. **This webpage** show you how to do that; note that you don't need to completely disconnect the carburettors, just swing them on top of the main spar, out of the way. Beware petrol leaks at this stage.

The photos here show the water pump area with the engine in the frame, because that was how I tried to do it first. Your engine will be out, but the method of getting at the water pump is the same.

Drain the coolant and engine oil.

If you didn't do this during the engine removal, remove the two clamps which hold the chrome water transfer pipe to the bottom left hand face of the engine (left). There are 4 Allen screws which hold the clamps in place. Pull the pipe away from the body of the water pump and drain off any coolant remaining. There will probably be a spillage at this point. The transfer pipe is a push fit into the water pump casing, and has a sealing O ring.

Pull off the thin rubber pipe from the top of the water pump body.

The water pump casing and body is held onto the rear of the crankcase by 2 x 14mm head bolts and 3 x 8mm head bolts (right), one is quite well hidden under the leftmost bottom edge of the body. Always use an 8mm socket, as these little bolts are quite soft, and are easily rounded off if you try an open ended spanner.

The pump body can be a stubborn fit. Give it a series of taps all round with a soft rubber mallet to loosen it, and using a broad bladed screwdriver, ***gently*** prise it away (left and right) from the rear engine casing.

Be very careful not to warp the aluminium casings, and as the body starts to come clear, don't force the blade into the gap and twist, or you'll distort something. ***Patience*** is the key here.

Once the body is free, store it with its five bolts.

Remove the 10mm dome nut and the brass washer from the end of the camshaft, and pull off the impeller rotor. This also can be a stubborn fit, and again the key is patient gentle teasing with a broad bladed screwdriver. If you break off the end of the camshaft, you are in serious trouble!

Don't lose the copper washer and the dome nut (right) and once you've wire-brushed the impeller clean, store all these pieces safely. I often store related components in clear plastic sandwich bags, label them and tie the necks. It's best to replace the copper washer. Just inside the flat face of the impeller is a thicker, steel thrust washer, don't lose this as it's important. It sits right inside the rubber boot which holds the ceramic seal.

Water pump area, showing (ringed, left) the overflow hole. This is where the weep comes from. As the mechanical seal fails, coolant leaks past it and drains down the little overflow passage, onto the left hand side of the rear crankcase cover, your left boot, and the H-box. As you can easily see from the photo, this is what happened here.

Once all the bolts are removed from the rear crankcase cover, tease the cover away from the engine main section. Try not to disturb the gearshift mechanism, as it's a little troublesome to re-engage it properly and it's best left alone unless you want to dismantle it for some reason.

Pull the oil seal out with a pair of pliers. If you haven't yet removed the remains of the old mechanical seal, insert something like a socket extension from the inside of the crankcase, locate it on the rim of the mechanical seal, and tap it smartly with a hammer, taking care not to score or damage the aperture.

The rear casing needs to be completely stripped of all components. The page on **replacing the stator** tell you how to do this.

Once the rear casing is stripped, offer up the new mechanical seal to the aperture and see if it is obviously too big. ***(See the note at the top of the page about there being two different aperture sizes)***. If it looks as if it will go in, wash and degrease the casing thoroughly (I put mine in the dishwasher, with no ill effects) and then heat your domestic oven up to 250 degrees C and place the casing inside. Most of us wait until the wife is out before we do this.

If you don't completely clean and degrease the cover before heating it, the smell of burning oil is vile ... and the wife will know what you've been up to!

Leave it for an hour or so, and with your 28 mm socket and new mechanical seal ready, remove the casing and place it open or engine end down on a firm, flat surface. Smear some gasket sealant round the circumference body of the mechanical seal and position it squarely into the aperture from the outside inwards.

Place your socket over the seal so that the socket's edge bears on the outer lip of the seal, and with careful taps of a rubber hammer, knock the seal into its housing. Be especially careful to keep the seal square on to the crankcase so that it goes in dead straight. Once it's fully home, allow the casing to completely cool, and as the metal shrinks, the seal is held in the housing. Don't use any pressure or force on the central part of the mechanical seal as this is particularly fragile. When fully home, the seal's outer lip engages with the aperture in the casing, and it's very obviously fully in.

Check that the drain is clear - I used a short length of coat hanger wire. Check that no gasket sealant is obstructing the drain hole at the water pump end.

Insert the new oil seal with its closed face towards the mechanical seal.

Before refitting the gearbox output shaft bearing, spin it round close to your ear and listen for any crackling or scraping. Likewise feel for any unevenness. If it shows any sign of stiffness or grating, replace it. These bearings are very robust and a failure is unlikely.

Reassemble the rear crankcase components, using a new camshaft oil seal, which goes in with its closed face inwards, facing the mechanical seal (diagram at the top of this page); and a new shaft drive oil seal and gearshift oil seal. The latter both drift in from the outside. Refit the rear cover, as per the **stator change** page. Put the gearbox into first gear, to hold everything still as you replace the cover.

Clean the impeller rear flat face (left) and the rear crankcase water pump area, and fit the thrust washer over the end of the camshaft. In the photo (right) the new thrust washer and brass washer are shown.

The ribbed thrust washer is VITAL and the most important washer on the whole bike! So don't think you can get away with omitting it, if you try this, or forget to fit it, the mechanical seal will leak.

Seal parts left to right : mechanical seal, steel splined washer, polo mint, rubber boot, impeller, copper washer, dome nut.

(*Thanks to Jim Nelson for the photo*.)

Impeller with the new rubber boot and ceramic seal face, what I call the Polo Mint seal (right).

Soap the rear face of the ceramic seal (left) before fitting the impeller, to lubricate the seal until the pump is delivering coolant to the components.

It's absolutely vital, for the psychological welfare of your bike, to do this with a cake of Imperial Leather!

Fit the thrust washer, impeller with its flat face towards the rear casing, the brass washer, and then the dome nut. Tighten the dome nut to 6½ ft lbs (0.8 - 1.2 kg/m). Again NEVER try this without a torque wrench as the stem of the thread is thin and easily overtightened. If you snap it off you will have to strip the engine and replace the camshaft - and CX camshafts are rare.

Refit the engine as per the **engine removal** page. Don't run the engine without coolant, and check carefully for leaks. When refilling the radiator, use a 50/50 mixture of distilled or deionised water (battery water) and ***silicate-free antifreeze***, with its distinctive pink colour. Silicate-free antifreeze is much better for the ceramic seal and cooling system generally. UK readers note that if you buy antifreeze from Halfords, it should be the more expensive "Advanced" formula, which does actually say silicate-free on the rear of the bottle.

The O-ring at the water pump end of the chrome pipe has a compatible replacement which is easily obtained from any UK Homebase DIY store's plumbing section. The part is Homebase 6 pack Assorted Small 'O' Rings, 5013669158680, Article 623904, £1.09.

I found that the water transfer pipe needs rather careful handling during refitting. It locates quite easily at the radiator end, but the water pump end has a double ridge, between which sits the O-ring. As the pipe is inserted fully home into the aperture of the water pump casing, it's quite a tight fit and the O-ring tends to deform. Then, it either gets trapped between the ridges and the casing, usually cutting it, or gets pushed right off along the pipe. Either problem will cause a water leak.

The O-ring sits between the two ridges on the chrome pipe's end. Smear a little grease all round the O-ring as a lubricant during reassembly. Also, tease the pipe's end into the casing very cautiously, checking with a lamp that the O-ring hasn't deformed. I used a very narrow screwdriver to gently push the O-ring along all round its shape, with the pipe as I inserted it.

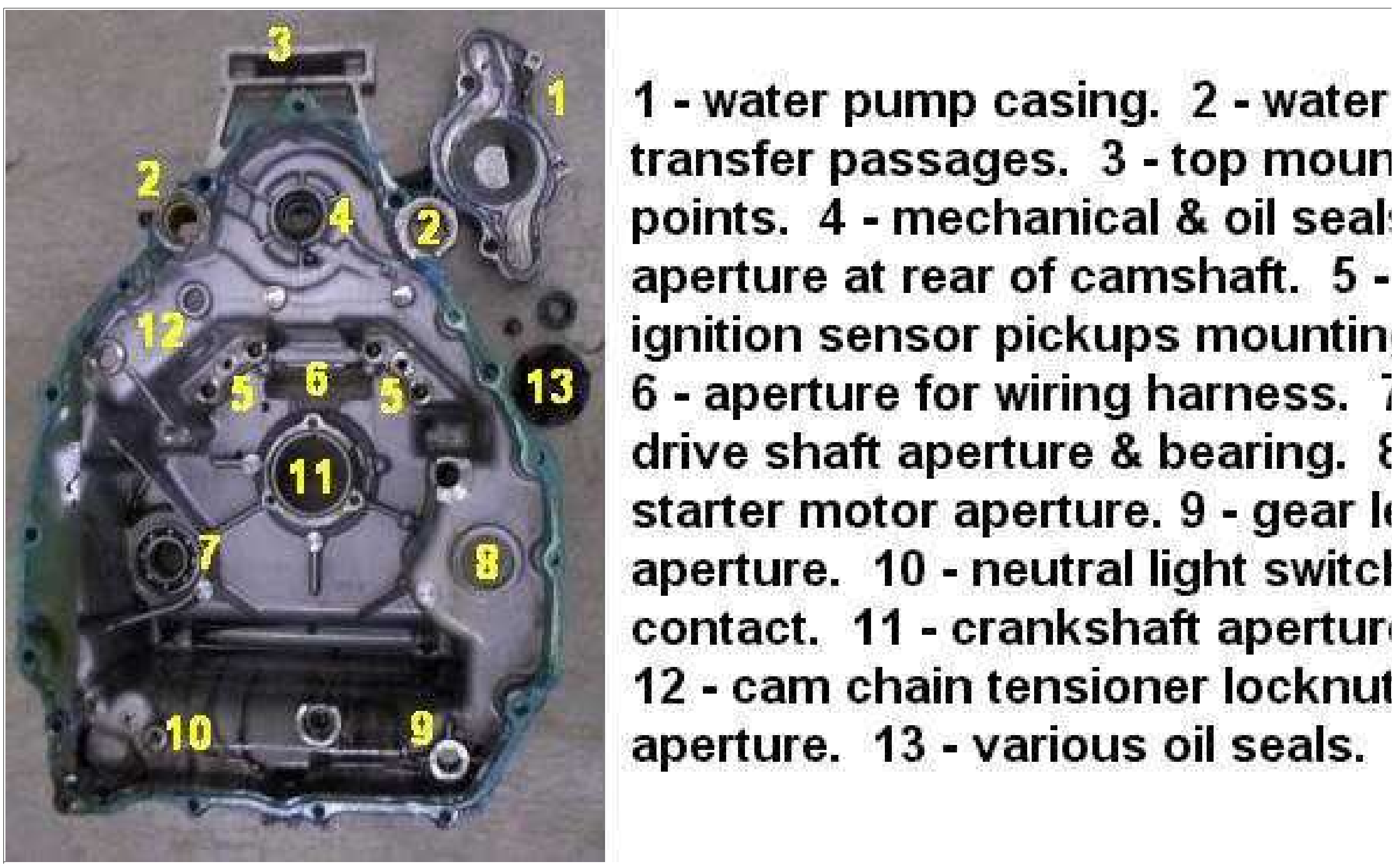
When the water transfer pipe is fully home, its sits correctly in the two mounting points on the left hand lower crankcase. If it isn't locating fully at these two places, it's displaced, probably because it's not fully inserted into the water pump casing.

If it does leak afterwards, just slip it out and examine / change the O-ring. A leak here looks like a bad mechanical seal, but it isn't. Don't panic.

Incidentally I have sourced the water transfer pipe and junction-to-cylinder-head o-rings at 20 pence each and I bought a dozen each of these for a fiver all inclusive. If you need these o-rings, contact Seals and Components Ltd, Village Road, Norton, Shifnal, TF11 9ED, Shropshire. Tel: 01952 730685. Fax: 01952 730665. The larger o-rings which seal between the 90-degree water junctions to the cylinder heads are BS-119 and the smaller and slighltly thinner ones which seal each end of the watertransfer pipes to the thermostat and junctions are BS-118.

Additional Photographs

Inside the rear casing.



Valiant's old ceramic seal being

prised out of its rubber boot. Note the score marks - the seal is knackered!

The rubber boot being lifted away. The previous spannerman hadn't bothered to refit the thrust washer, which is probably why the seal was knadgered at only 42,000 miles.

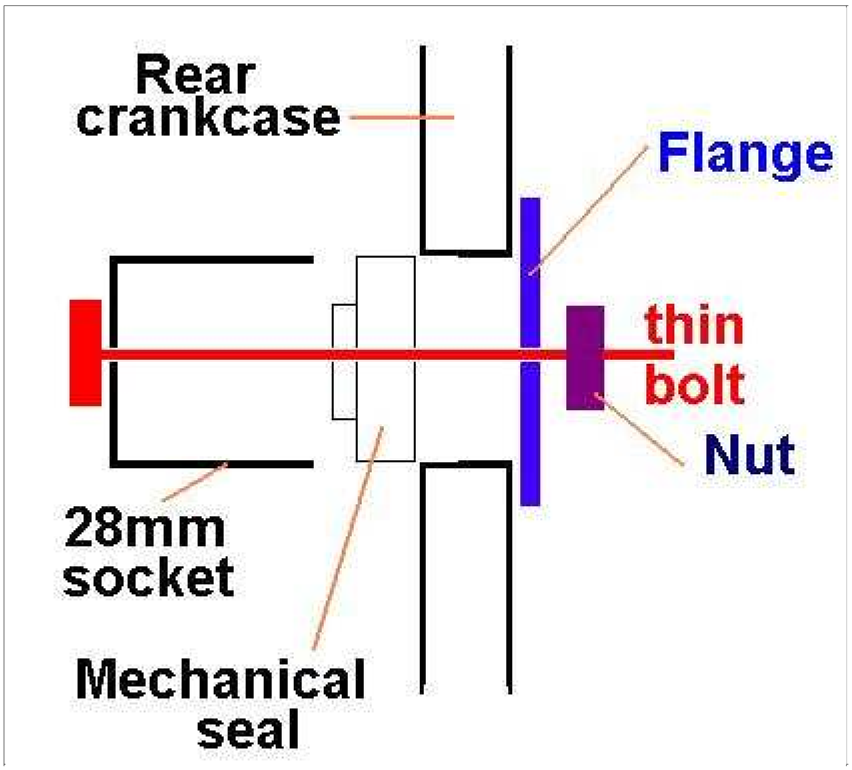
Knackered rear camshaft seal, seen prior to removal. This is the inside face of the rear casing, showing the seal correctly fitted with its closed face towards the mechanical seal. The best way to get this seal out is to insert a socket from the other side, and simply tap it free.

When I poked my gloved finger through from the water pump side, the oil seal disintegrated. Imagine the fun if this spring ring had come off and wrapped round the camshaft ...

The stained rear crankcase after stripping. Notice the most important accessory of all, which is seen here on Valiant's rear carrier!

Ian Shearer makes some useful comments : "I just put in a mechanical seal and decided to try it without heating the casing, as the Honda manual says to just press it in with the special tool, and I couldn't honestly see why heating would be required. Here are some photos of how I pressed the new one in. I used the same method to pull the old one out, and then I put the old one back in again for practice. It seemed OK, so I went ahead and pressed in the new one. The casing diameter was 28mm. Bike is a 650 Eurosport."

Diagram of the home-made insertion tool. The thin bolt is slim enough to pass through the mechanical seal (where the camshaft tail pokes through to drive the water pump) and as the nut is tightened, the socket bears against the mechanical seal lip, and pulls it into the crankcase aperture. The flange just spreads the load over the inner surfaces of the crankcase.

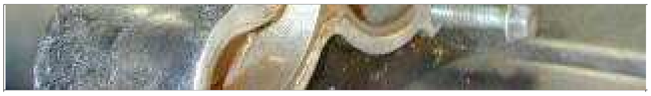


Removing the old seal.

Close-up of the seal aperture, showing where a previous seal change has damaged the rim.

The drain hole is clearly seen in this photo.

Pressing in the new seal, using the home made tool, and without heating the rear crankcase cover.



The new seal fully inserted into the aperture.

Job done, at (says Ian) "an ambient temperature of 8C".

When refitting the rear cover, don't insert or tighten the bolts until the action of the gear lever is found to be correct. It's extremely easy to dislodge the gear level actuating teeth whilst easing the rear cover into place.

MANY THANKS to Ian for taking the trouble to photograph as he went along.

More useful stuff from Rick Hoad of Derby

"If you have the smaller 27mm aperture, use a 30mm flap wheel and power tool to gently ream out the orifice to accept the Yamaha seal. Flap wheels don't grind the metal away like an abrasive wheel would."

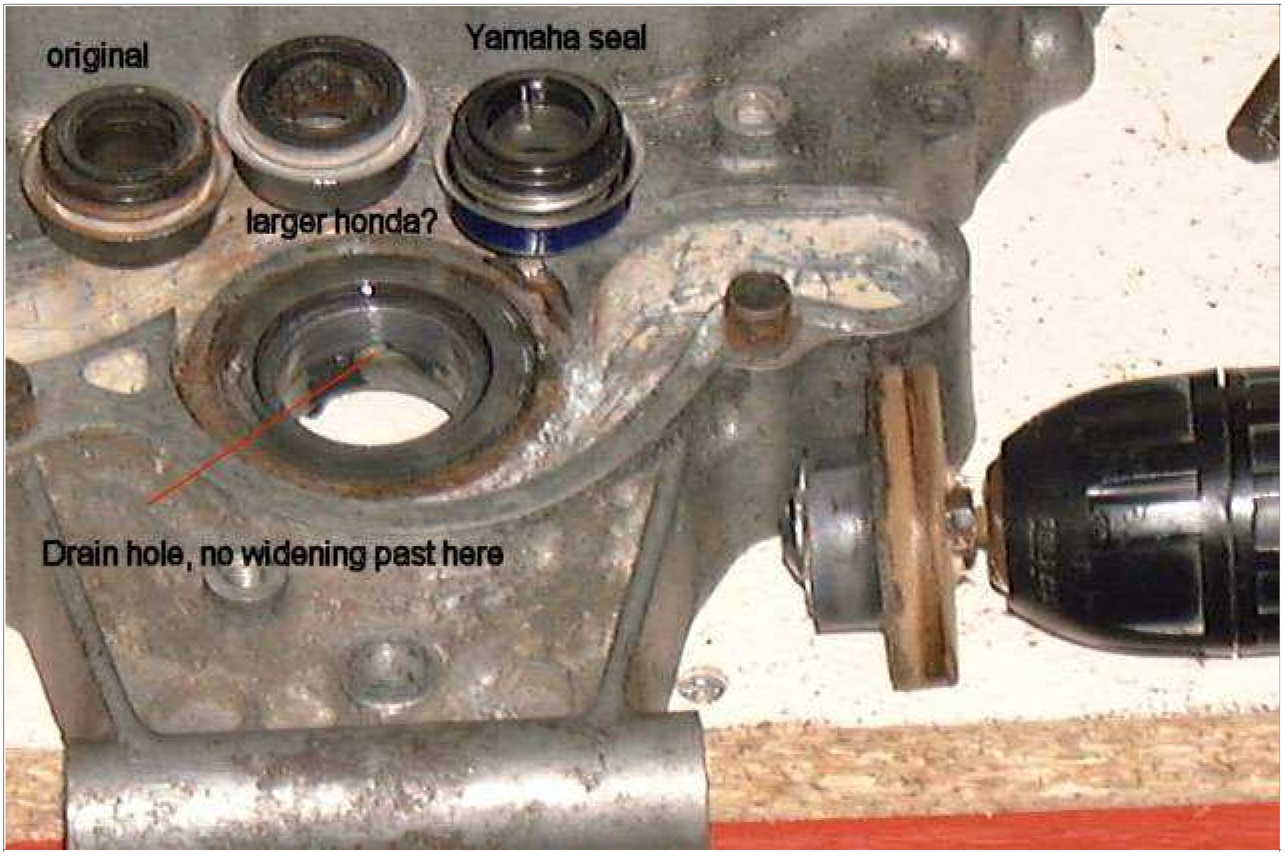
BE VERY CAREFUL not to run the flap wheel in deeper than the drain hole!

If you open the aperture all the way through, you are also widening the hole for the oil seal - and it won't seal. Don't ask me how I know this ... aaarrrggggggghhhhhhhhhh !!

"Here you can see the 30mm flap wheel inserted into the orifice and it very gently eases out the diameter of the aperture."

"View from the inside face of the rear crankcase, showing the mechanical seal correctly inserted."

Thanks to crack spannerman Rick for these invaluable tips.



Reg Worth adds:-

"I use this method for converting the rear cover to the yamaha seal. It's probably slower than a flap wheel but less prone to overcooking it as the oiled, fine W&Dry gently laps the rear cover out
(with frequent stops to measure the diameter!).

"The diameters are : inner 25mm, outer about 35mm, made from 10m thick MDF. There's no accidental widening of the oil seal section."

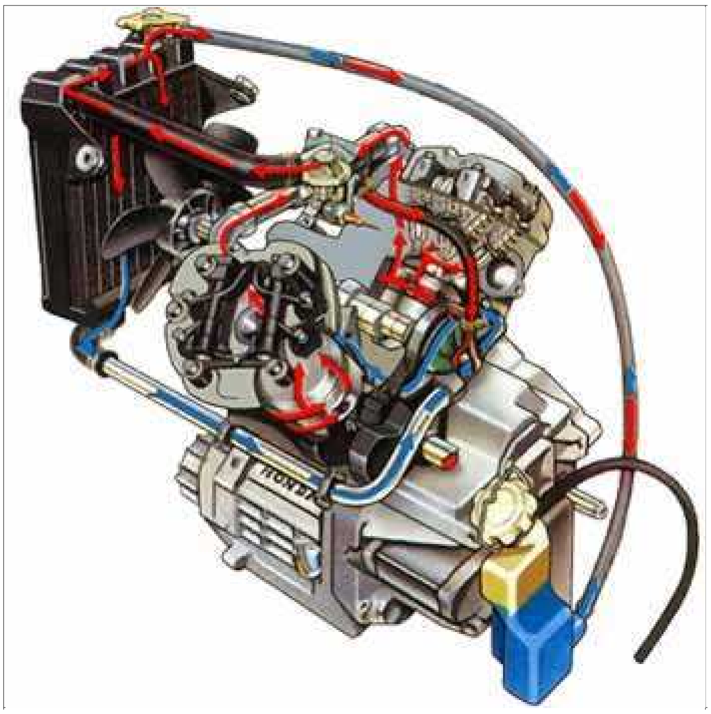
You are welcome to **comment** on these pages.

CX/GL 500/650 Radiator Removal, inc. fan and tachometer drive casing

This site will tell you how to remove the radiator, fan and tachometer (rev counter) drive mechanism. I am very receptive to comments and suggestions but you use this information at your own risk.

Skill Levels explained.

Skill Level : 2. Personally dirty : 2. Work mess : 2. Tools : 1. Space : 1.



Cooling system (left) for CXs and GLs. Hot liquid is shown in red and cooled in blue.

Coolant is pumped by the water pump impeller directly to the left and right cylinder jackets, where it carries away heat produced by the engine. The liquid is pumped upwards from each cylinder to the thermostat. If the engine is not at normal working temperature, the thermostat is closed, and the coolant recycles directly back to the pump, along the feeder pipe at the top of the engine. This helps the engine reach its full temperature quickly.

Once the temperature is raised, the thermostat opens and allows coolant to run into the top of the radiator and down through the fine chambers, where the rush of the slipstream, aided by the fan, cools it. It then runs along the chrome transfer pipe and back to the pump.

Any excess coolant overflows from the top of the radiator and into the opaque reservoir bottle at the rear of the engine. If the coolant level drops, liquid is drawn from the bottle back into the cooling system, and recycled. That is why you top-up the coolant from the reservoir, not the radiator.

You don't need to remove the engine from the frame. In most of these pictures, Valiant's engine is removed, but it was out anyway, for other work to be done.

Remove the petrol tank and radiator cap. Drain the coolant into a bin or drain tray, by removing the small plastic drain plug at the bottom of the radiator (circled, right). This plastic bolt is fragile and should be treated gently, especially when ressambling. Don't screw it in more than finger tight.

Use an allen key (left) to unfasten the top of the radiator shrouds, left and right side. Early CX500s have a one piece black plastic shroud which bolts on as per the following photos.

Another Allen key unfastens the shrouds' side holding bolts. Lift the shrouds away and give them a good clean.

Your engine has either:-

14mm bolts (left) through the radiator surround and these also clamp the engine to the black engine hanger. Your engine should not drop out when you remove all four bolts, but if you are working with the engine in the frame, it would be sensible to support it with a block of wood underneath, held up with a jack. This will save strain on the other engine bolts. These bolt holes can strip out, but can be repaired with a suitable kit.

or:-

Instead of these bolts (which are usually fitted when crash bars are added) there are steel studs which are screwed into the aluminium engine casings and poke through the engine hanger and radiator brackets, with a 14mm nut on the front ends. If you have these studs, remove the 14mm heads.

10mm dome nuts (right) hold on the three round chromed holding bolts which attach the radiator assembly to the engine hanger.

Once unbolted, these pull straight out. There's a chrome mushroom affair (left) which passes through the rubber anti-vibration mounting grommet.

Pull the overflow hose (right) off the top of the radiator, directly underneath the cap.

Unfasten the big double wire circlip which clamps the main radiator hose to the thermostat assembly, directly under main spar, and pull off the hose. These are often quite reluctant to get clear; don't use

anything likely to puncture the hose or damage the radiator.

Undo the four Allen bolts (right) which hold the chrome water transfer pipe down the left hand side of the engine. The pipe then pulls off at the water pump end just forward of the carburettors, and some coolant will probably spill out.

To prevent foreign objects getting in, stuff a piece of rag or kitchen roll into the end (left).

The radiator should then just pull away. Lay it on a flat surface (right), where it can't be damaged, as the fins are very fragile. Unbolt the fan's protective screen mesh or guard.

On models with the electric fan, disconect the fan's power lead and it comes off as a complete unit with the radiator.

This leaves
the fan and the circular radiator housing. The housing should also just pull off, although it needs some wriggling to get it round the frame, especially if you have the engine studs rather than the bolts.

Replace the radiator cap, and use a water jet (right) to blow out any accumulated dirt or debris. Be very careful about poking anything between the fins as they are very delicate. Use the water jet in both directions.

I was lucky and had a particularly mild late February afternoon!

Squirt the water jet down the open end of the transfer pipe to reverse-flush the radiator. Keep squirting for several minutes, at least until you can see quite clean water coming out where the top radiator hose attached.

Give the fan a good clean and particularly, check the blades for cracks and distortion. A cracked fan can explode and wreck the radiator, so if there is any wear or damage, replace the fan.

500s have the mechanical fan which is a push fit on the end of the camshaft (left).

The mechanical fan unbolts with a 10mm bolt (right) onto the front end of the camshaft. Sorry, 650 owners, but I don't have any pictures of your thermostatic electric fan. This is the mechanical fan of the 500s.

Now the fun begins, as you will need a front axle to remove the fan. Altough the fan is a simple push fit onto the tapered end of the camshaft, it tends to stick very firmly. However the thread let into the boss of the fan is the same as that on the end of the front axle (left).

I was lucky - I have a spare front axle - otherwise, prop up your bike and remove the front axle temporarily. The **fork seal page** tells you how to do this.

Use the axle to screw into the boss of the fan, and wriggle the fan off the end of the camshaft.

When you put the fan back, first smear some grease over the tapered camshaft end. Hopefully it will come off more easily next time!

Exposed tachometer (rev counter) drive at the front of the engine. This is held on by three 8mm head bolts, and the casing can then be teased off with gentle levering.

Remove all traces of the old gasket, on both the engine and the tacho drive casing.

Reassembly

This is a straightforward reversal of the removal, with new oil seals in the tacho casing and a new gasket between it and the front engine casing.

CX engines tend to leak oil from the seal inside the tacho casing, the seal which fits over the end of the camshaft, so always replace this seal, and the small one which fits deeply inside the hole where the tacho cable goes in. These seals should be part of a gasket set. Smear some grease over the camshaft end before refitting the tacho drive cover.

When refitting the radiator, use a new O ring at the junction of the water transfer pipe and the water pump. A leak here is easy to fix, but I also use Hylomar as an extra precaution. To help get the big hose back onto the radiator, smear a little grease over the outer circumference of the junction.

The O-ring at the water pump end of the chrome pipe has a compatible replacement which is easily obtained from any UK Homebase DIY store's plumbing section. The part is Tantofex 1162 and comes as a set of 2 washers and 2 O-rings. The washers are no use, but the O-rings proved to be a perfect match for the bike. At £1.75 for the pack of 2 they are much cheaper than the genuine ones.

Incidentally I have sourced the water transfer pipe and junction-to-cylinder-head o-rings at 20 pence each and I bought a dozen each of these for a fiver all inclusive. If you need these o-rings, contact Seals and Components Ltd, Village Road, Norton, Shifnal, TF11 9ED, Shropshire. Tel: 01952 730685. Fax: 01952 730665. The larger o-rings which seal between the 90-degree water junctions to the cylinder heads are BS-119 and the smaller and slighltly thinner ones which seal each end of the watertransfer pipes to the thermostat and junctions are BS-118.

Radiators ***can*** be repaired if they leak, but this is a specialised task best left to an expert.

When refilling the radiator, use a 50/50 mixture of distilled or deionised water (battery water) and

silicate-free antifreeze, with its distinctive orangey-yellow colour. Silicate-free antifreeze is much better for the ceramic seal and cooling system generally. UK readers note that if you buy antifreeze from Halfords, it should be the more expensive "Advanced" formula, which does actually say silicate-free on the rear of the bottle.

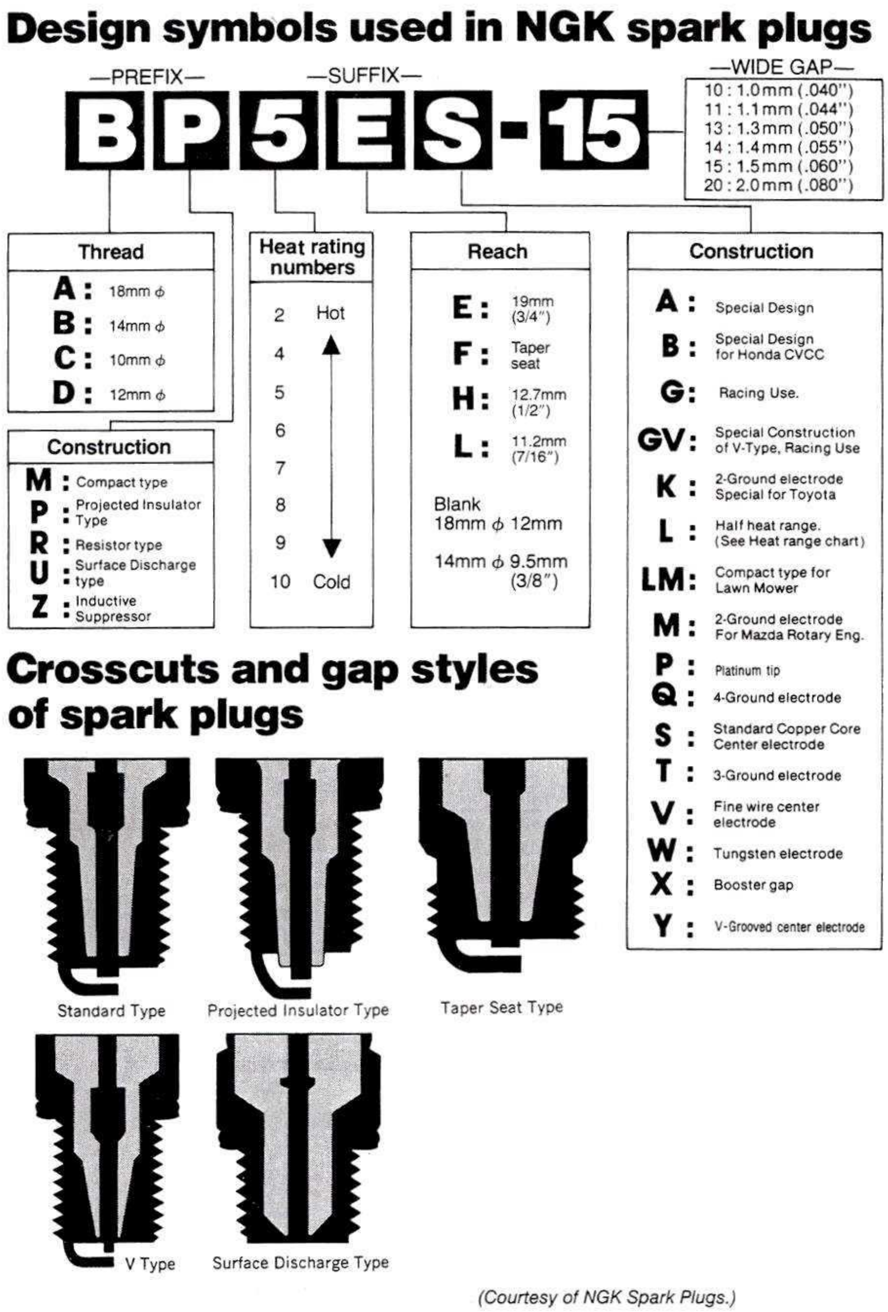
Sidecar Bob from Canada comments : *"Coolant is only good for a couple of years, and changing it is almost as important as changing the oil. If your cooling system hasn't been properly serviced in the last couple of years, this would be a good time to do it. You should be changing the hoses, rad cap and thermostat too.*

"Take the old parts to your local AUTO parts dealer - he can supply them for much less than your Honda dealer. Depending on your model and year, the hoses may be short pieces of bulk hose, or (if sharp bends are required) may be able to be cut from an in stock heater hose. Don't forget new clamps - stainless ones aren't too expensive and you will be able to undo them without stripping something when you do it again in 2 years. The thermostat is the same one used in late '70s Civics (I have been using them in GoldWings for years). Rad cap is a standard automotive 13psi. You should replace the 0-rings at the ends of all the tubes in the cooling system. There are 5 rings, all the same size for the tubes and 2 for where the jointsbolt to the engine. They should have a perfectly round cross section - not oval or square. There is also an o-ring in the thermostat housing that should be changed.

"If you leave the rad cap on and open the cap on the overflow tank when you open the drain screw, the fluid in the overflow tank will be siphoned out. Once the tank is empty, remove the rad cap and throw it out. It's easier to change the hoses if you remove the rad. When you have it off, remove and throw out the thermostat, re-assemble the 'stat housing and flush the engine with a garden hose in the upper rad hose. Flush the rad too, and hose it off while you're at it. You wouldn't believe how much debris you can get out of the rad by spraying with a garden hose from the engine side. All those bugs &c that went in the front at highway speed and didn't come out the back for years are impeding the efficiency of your cooling system."

You are welcome to **comment** on these pages.

CHART OF SPARK PLUG CLASSIFICATION



CX / GL 500 / 650 Alternator and Stator Health Check

Stator Remove / Refit

and the "White Wire Fix"

Skill levels explained.

Skill Level : 1. **Dirty Level** : 1. **Work Mess Level** : 1. **Tools level :** (special) : multimeter. You cannot check or diagnose a stator without a multimeter, but they are useful tools, and it's worth buying one and learning how to use it. **Space required** : 1. **Time** : *expert* 10 minutes, *average* 15 minutes, *"first-time"* 20 minutes.

All the hands, tools, and bike in the photos are the author's.

I am very receptive to comments and suggestions, but you use these pages entirely at your own risk.

All nut and bolt sizes are quoted as the spanner size required to fit them.

I have a very comprehensive Word document which is an electrics faultfinding chart, please ask you would like a copy (365k zipped or 522k plain).

This page will show you how to check the output voltage from the stator on your CX / GL engine. It can be done whenever desired, or whilst investigating a misfire.

The stator is located inside the rear engine casing and is a halo-shaped wiring coil with several individual circuits providing various functions. The current from it is produced by the alternator rotor, which is bolted to the rearmost section of the crankshaft, revolving rapidly around the stator as the engine runs.

The CX and variants engine is prone to partial stator failure as the bike ages, mainly due to the conditions of heat and oil in which the stator lives. The Turbo models are especially likely to suffer, as these engines run rather hotter than the normally aspirated types. Whilst diagnosis is simple, replacing a stator does mean removal of the engine and rear crankcase cover. However, if your stator has failed, there is a good get-you-home or short term "fix".

Am I CDI or Transistorised ignition?

The general rule is that the 500s except the GL500 and CX500E-C Eurosport have CDI ignition and all the rest, including all the 650s, have transistorised ignition. However the model is so old that many bikes have engine transplants!

The easy way to check is to:-

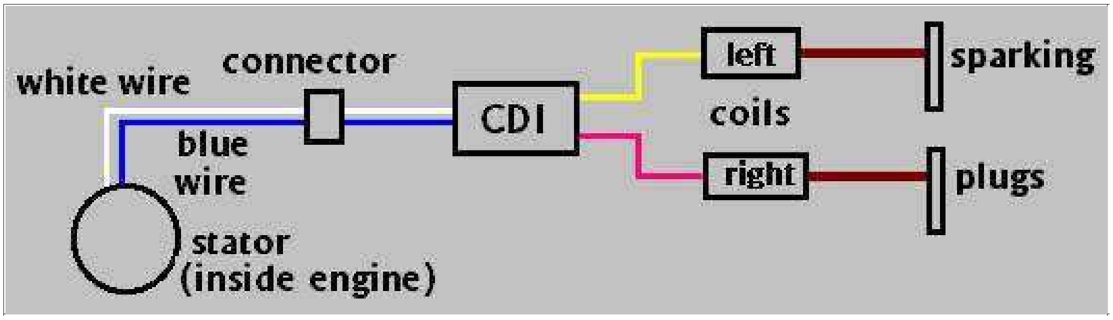
> look under the saddle. Just behind the air intake is either a gold or black box, about the size of a packet of 20 cigarettes. If this is present and connected up, you have CDI ignition (see photo lower down).

> look behind the left hand side panel. Just behind the battery, if you can see two identical silver ribbed boxes each about the size of a matchbox, you have transistorised ignition.

This diagnosis *ONLY* applies to CDI ignition bikes.

Symptoms

For the purposes of generating the voltage required to trigger the CDI (capacitor discharge ignition) unit on your bike, which then via the ignition coils and sparking plugs, generates the spark which fires the engine, there are two independent circuits contained inside the stator (*diagram below*). One provides a minimum of 90 volts up to between 4,500 and 5,000 rpm; this is the low circuit with the white wire. Its partner with the blue wire operates the high circuit above this engine speed, and produces a voltage of at least 100 volts. On the CX engine, partial stator failure is indicated by the engine refusing to rev much above 5,000 rpm (if the high circuit has failed) or below 5,000 rpm (if the low circuit has failed).



Left and ***right*** are as you'd see them from the normal riding position.

Misfiring has many causes, not necessarily due to a bad stator. So, before committing hari-kari, removing your engine or starting other major operations, try the following:-

> install new sparking plugs. I have had a misfire which had me thinking "Oh no, a stator change" but new plugs solved the problem. I use NGK DR8ESLs on my 1981 UK CX500A, and regard 3,000 miles as a maximum lifespan for plugs. I ALWAYS carry spare plugs. I've recently tried a pair of D8EAs and found that these work a little better than DR8ESLs. Also try new plug caps.

> faulty ignition coil. Having had the dreaded 5,500 - 6,000 rpm misfire, where the engine bogs down, I checked the stator voltages and found they were at the minimum. So I had a spare stator professionally rewound, and fitted it. The engine was very much improved, until during a heatwave, the misfiring returned. After swapping out the spare CDI unit and the left hand coil, to no avail, I replaced the right hand coil and the problem went away. It seemed that ambient temperature of 25C+ (which is a heat wave in the UK!) added to the residual engine heat, was too much for the coil, which was probably nearing the end of its life.

> disconnect the undersaddle electrical blocks and thoroughly clean both halves, getting a wire cleaning brush right into the male and female connectors. Then spray with WD40 and wrap the connectors in cling film or a plastic shopping bag, to keep out dirt. I also cured what I thought was a stator failure, by cleaning the connectors, which had simply accumulated dust and dirt.

> check that there is no electrical shorting (arcing) between the ignition coils and earth, particularly against the main spar, or between the high tension plug leads and the engine. This can be a very subtle fault and is best investigated in complete darkness whilst the engine runs. Any arcing is much more easily spotted in darkness. Check that the red engine kill switch doesn't have something sparking merrily inside it - on the dark, you can see this easily.

Dave in Atlanta, Georgia USA had a new Electrex stator fail and had posted details here. My own experience of Electrex stators has been bad and I don't recommend them. Details of recommended stator suppliers are further down the page.

Diagnosis

This diagnosis can ONLY be carried out with a fully charged and functional battery. If your battery is suspect, you should replace it, or the voltages you are trying to read may well be incorrect.

Remove the saddle and locate the set of three male-to-female connecting blocks just by the air filter box. The one in question is the ***only*** two-wire one, a white wire (the low current) and the blue wire (the high current.) In the photo (*left*), I've lifted out the the stator connector. Notice the plastic sheeting which I have wrapped round the three connectors, to keep out dirt and muck; and the CDI unit in the bottom left part of the picture. Some variants have gold-coloured CDI units instead of the black one shown here; the two boxes are interchangeable.

Remove the sparking plugs. Turn off the fuel and turn on the ignition. Ensure the gearbox is in neutral.

Disconnect the white / blue wire connector and make sure that you have the male end (*right*) which leads to the alternator.

The other, female end (*left*) goes to the CDI unit, which is the dull black box directly behind my fingers.

Set your multimeter to read a range between 60 and 250 volts AC, and put the positive pin of the multimeter on the spade connector of the white wire circuit and the negative pin of the multimeter to any convenient earth point, perhaps the engine or even the negative terminal on the battery.

Spin the engine on the starter motor and watch the reading on the multimeter. On the white or low current wire, you should get a reading of about 90 volts AC. ***Remember that the battery must be fully charged.***

Now swap the positive lead from the multimeter to the blue, high current wire; leave the other terminal from the multimeter on the earthing point. Turn the engine again on the starter motor. The reading should be about 100 volts AC.

If either reading is below par, it means that particular circuit has failed or is failing. If the stator is on the way out, the voltage reading will drop as the engine revs higher. This is because cracked insulation on the stator, or simply old age, is causing the electrical power to "leak".

Some readers have commented that their bikes run well with as little as 60 volts output, but this does show that the stator is living on borrowed time. If the engine is due to come out anyway - change the stator.

Whilst you are in there, use your multimeter to check that none of the three yellow wires have a continuity to earth. These work the charging system. Any earthing on these circuits shows that the stator is not charging the battery properly.

Detailed Diagnosis

Your multimeter can be used to check the resistance of the two stator circuits. The low (white) charging coil is grounded with its lower end. The high (blue) charging coil with its lower end is connected in series to the low coil upper end, and that's the point where the white wire is connected. The upper end of the high coil is connected to the blue wire. Both the white and blue wires end in the 2-pin block connector.

Stator failure can cause misfiring and power loss even with the blue and white voltages well within the limits - so check the resistances as well as the voltages!

The earth, or ground, signal coming from the stator is the green line at the big (8-1 pin) block connector.

To test these values, set your multimeter to measure resistance and the readings between the wires should be as follows:-

Between the	and the	Lowest resistance (ohms)	Highest resistance (ohms)
Green	White	387	470
Blue	White	77	99
Blue	Green	should be the other two values added together.	

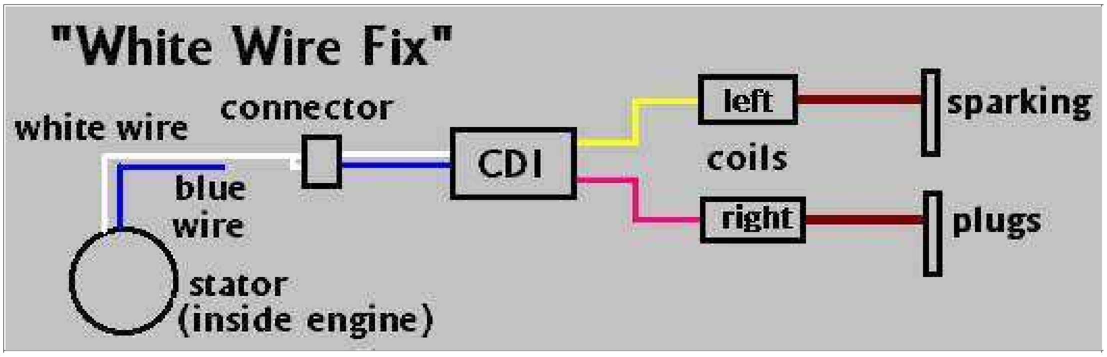
Klaus Werner kindly made some useful comments to this page, and he says *"The tolerances* *above are quite big. My CX500 Custom has 387 for low coil, but only 73 for high coil, but runs well. One problem measuring the values is, that you need to get proper contact by the measuring tips, since most of the tips are not really sharp and the wire and contact surfaces of this old equipment is corroded. Instead of the standard tips coming with the instrument, one should buy professional tips, which are really sharp pointed. When measuring high voltages this does not matter, but for measuring low resistances it is essential. The low currents and voltages used for the latter don't 'break' any insulation caused by corrosion."*

He continues *"You can also check the output from the alternator charging circuit, by measuring continuity of the main power coils on the 3 yellow wire undersaddle connector. With this connector disconnected, none of the wires must have any connection to ground, otherwise the 3-phase generator has failed."*

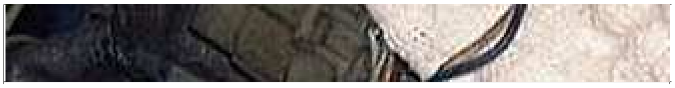
The White Wire Fix

If the blue (high current) has failed, your bike will be very reluctant to rev much about 5,000 rpm which will restrict your speed to about 50-55 mph. Changing the stator will of course fix this, but there is a get-you-home or short-term fix for the problem, ***only*** if the blue or high circuit has failed.

Cut the blue wire 1" back from where it arrives from the alternator to the connector box and insulate it, taping it out of the way. Patch the stub of the blue wire from the connector box to the white wire's connection at the box. This takes the low current and sends it to ***both*** circuits. It isn't enough to give full high power to the CDI unit, but it does give much better performance than nothing at all. It is also recommended to reduce the sparking plug gap by 2 thousandths of an inch, to give the spark a shorter jump and less work to do.



Reg Worth (electronics wizard) sends these two pictures of the white wire fix.



I have recently had a a case where the engine misfired on one cylinder, the stator voltages checked out within the specified voltages, but a resistance test showed other faults. This was "cured" with the white wire fix, but a new stator is the proper answer. The white wire fix has apparently been used for months at a time with no ill effects, but the only true remedy is to bite the bullet and remove the engine, rear cover, and change the stator, or at least have it professionally rewound. If you're going to do that:-

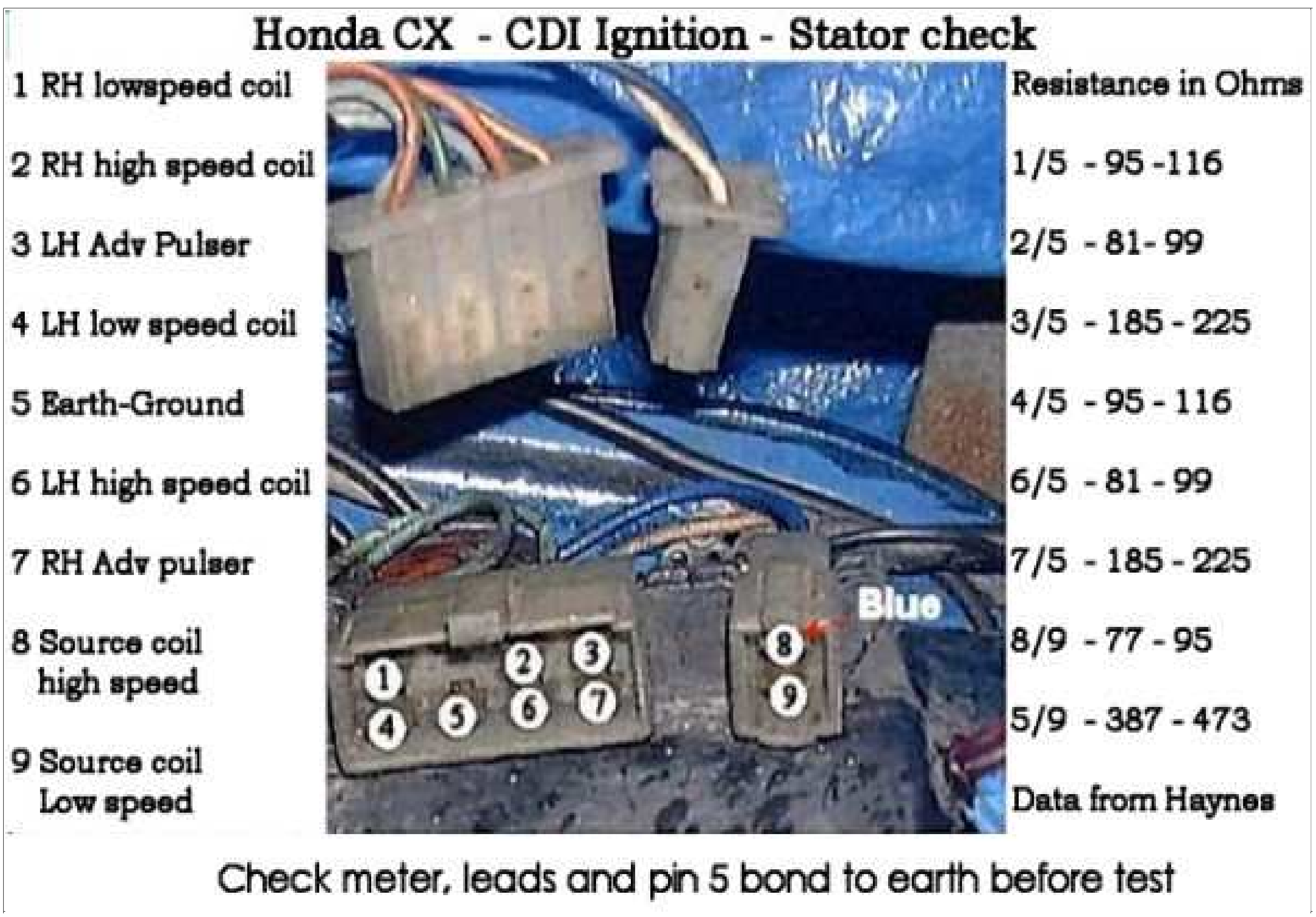
> replace the cam chain, its guide blade, tensioner blade and spring if the old ones have done more than 20,000 miles;

> replace the mechanical seal if the old one is leaking or has done more than 20,000 miles.

However, don't do a "blue wire fix" as the 100+ volts from the high circuit will damage the CDI unit if that much voltage is fed down the low (white) line.

I have a full schematic diagram of the CDI unit, which I'll email on demand.

Below is the pinout diagram for the main undersaddle connections, with their electrical check levels.



Don in Australia,on the subject of testing stators without having it fitted to the engine, says:-

"*You can really only be certain about the CDI section - after resistances and insulation measurements - by running it in a bike. I have repaired at least eight CDI stators until they all met the above referred figures, and they all worked in motors, but I wasn't happy with the repair until the motor had fired up and I had measured voltages - with an oscilloscope."*

Stator Rewinds

I have been informed of the following companies who sell new stators and do stator exchanges. Please advise me if you are given updated prices.

Bernt Muhl, Muhl CX500-Shop, Jahnstr. 5, 21435 Stelle, Germany

Email or website

(Stelle is 8 miles SSE of Hamburg, in Saxony)

Model	***Type***	***Price Euros***
CX500 - 82	Exchange (send your old stator)	172.50 + 15 freight
CX500 82 (CX500E / GL500 etc)	Exchange (send your old stator)	149 + 15 freight
CX500 82 (CX500E / GL500 etc)	New stator	193.50 + 15 freight
Freight charges quoted are to the UK. Enquiries from other countries are welcomed.		

Hadler's Garage PM Ltd, 198-200 Baddow Rd, Chelmsford, Essex CM2 9QP, UK. 01245 354844

(30 miles ENE of Central London)

Model	***Type***	***Price Sterling***
CX500	Exchange (send your old stator)	£76.38 inclusive as at 11-Jul-03

HIGHLY RECOMMENDED!

West Country Windings, 79 City Business Park, Somerset Place, Stoke, Plymouth, Devon PL3 4BB UK. Tel: 01752 560906, who say "We will first check over your old one and see what's wrong with it, and then contact you to see what's best."

I sent these people my old stator on Friday by parcel post, and had the rewound one back on Tuesday morning by 1st class post. Beat that if you can, what amazingly good service! They will ship to anywhere in the world, at additional cost. They keep CX stators on the shelf ready, and normally ship the same day that you agree the work and cost. One US owner paid an extra £13 to have his stator sent to Florida.

I've now had two of these stators and UK CX/GL Owners use them regularly. We've not had one fault.		
Model	***Type***	***Price Sterling***
CX500	Exchange (send your old stator)	£110 + about £5 for UK postage.

Custom Rewind, 2014 Pratt Highway. Birmingham, Alabama, USA 35214. Phone 1-800-798-7282 and talk with Gary		
Model	***Type***	***Price US Dollars***
CX500	Exchange (send your old stator)	US$ 240 including shipping

"**Bert" (owner), Small Coil Rewinds, 50 Edols Street, North Geelong, Vic., 3215. Australia.** Phone, 03-5278-8454.		
Model	***Type***	***Price US Dollars***
CX500	Exchange (send your old stator)	AUS$???

Stator Removal / Replace

If your stator needs replacing, this is how you do it.

Skill level (after engine removal) 1. ***Personally dirty*** : 1. ***Work mess*** : 1. ***Tools*** : 1. ***Space*** : 1

Time (after engine removal) expert 15 minutes, average 25 minutes, "first time" 35 minutes.

"Drift in / out" means to use a tool such as a socket, or metal pipe, to act as an agent between the object being removed / replaced and the hammer or mallet. The drift should be a very close match to the outer diameter of the object, and prevents damage to it, only allowing force to be applied to its outer edge. For example, a bearing is often a very tight fit in its space, and to bang it with a hammer would damage it or its aperture. Using a drift over the bearing allows force to be applied to only its edge.

Skill levels explained.

Remove the engine from the frame. If you are replacing the stator, you are strongly advised to:-

> change the **cam chain and tensioning apparatus** if these have done more than 20,000 miles. There are additional pictures of these components are on the "engine out" and "**decoke**" pages. This advice applies whether you have a manual tensioner (all 500s except Eurosport) or an

automatic tensioner (500 Eurosport and all 650s).

> replace the **water pump mechanical seal** and camshaft rear oil seal if these are weeping, or have done more than 20,000 miles. Mechanical seal failure is indicated by a coolant leak (the dreaded brown stain) over the rear left crankcase cover.

Both these jobs can ONLY be done when the engine is removed, with the rear crankcase cover is off. Working on the tried and tested principle of Sod's Law, the week after you change the stator, your mechanical seal will start weeping. As you have to strip the rear crankcase bare before changing the mechanical seal, for the sake of a tenner and another hour's work, you might as well do it now.

Naturally you will replace all rear crankcase gaskets and seals, these are best bought as a complete kit.

Remove the **water pump housing** and impeller.

Before you start, lay the engine face down (ie on the fan or radiator end) on a thick towel. It's easier to work on the engine this way, and any fluid will drain forwards into the engine casings, rather than leak out onto your work area. But some coolant and oil drips are inevitable.

Remove the 8mm and 12mm head bolts which secure the rear crankcase cover to the centre section. Using a rubber hammer or a block of wood, tap the rear casing sharply all round its circumference, to free it. Usually it sticks around the "shoulders" where the water transfer passages are, either side of the water pump base. The crankcase metal is VERY thin around the passages area, so don't use any lever force here.

If the casing won't come off, tap it with your rubber hammer or wood block at the very top, above the water pump casing, where the top holding bolts attach to the frame. Later models don't have this bracket and the rear casing is different. In this case, lever very cautiously between the middle engine section and the rear. Don't poke a screwdriver into the aperture as it opens up, or you'll damage the mating surfaces.

As the rear cover comes free, push inwards on the gear shift arm so that it stays in place, engaged with the mechanism at the bottom of the centre engine section. Leave the shaft drive in place.

Clean off all traces of the old gasket from both casings. Discard the two O rings around the water transfer passages.

I will work on the basis that the rear cover is to be stripped down and a new mechanical seal fitted. If not, omit the sections starting with an asterisk.

Disconnect the neutral light lead. This exits the thick wiring harness close to the engine casing and runs behind the casing to a connector immediately below the shaft drive output.

Remove the rear ignition pickup cover.

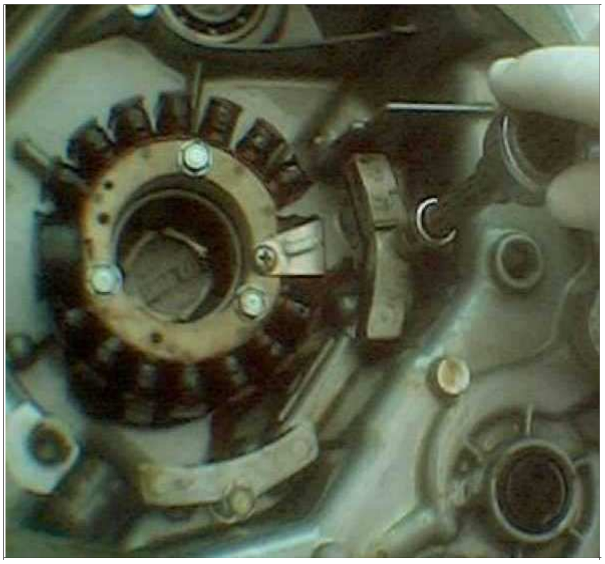
*See that on the pickup ring, there is a small index mark (ringed) at 12 o'clock which marries up with a slot in the engine casing. Normally these two marks are in perfect alignment, but if yours is not, make a careful note of how the ring is aligned to the casing. It this adjustment which allows the ignition timing to be adjusted - which isn't normally necessary.

Peel off any silicon gel and disconnect the ignition pickup ring's two connectors.

*The pickup ring (right) is held in place by 2 crosshead screws and you may need an impact driver to dislodge them. Remove the ring.

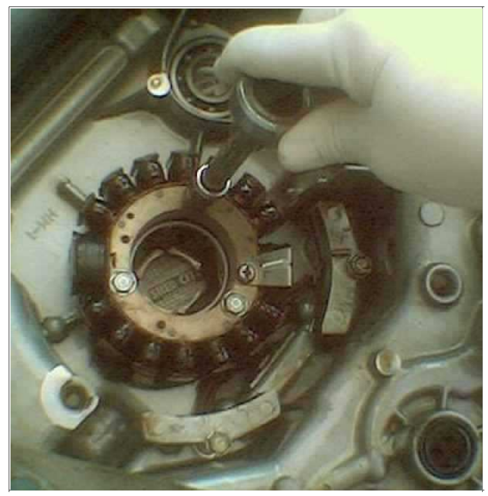
Pull away the two rubber grommets at the top of the rear casing, and feed the thick electrical cable through the small aperture so that all the wiring is "inside" the engine casing.

Remove the left and right ignition sensors, each held in place by one 10mm head bolt. Loosen them from their mountings, they are attached to the stator, so



don't pull them off.

Remove the three 10mm head bolts holding the alternator stator, and remove it with the attached sensors.



*Pull off the shaft drive oil seal flange, this comes off backwards.

*Drift out (left) the shaft drive crankcase bearing (right) from the outside, inwards.

This was a 27mm socket used as the drift.

Drift out the gearbox oil seal.

*Visually check that the rear crankcase cover is completely free of all fitments and components.

*Fit the **mechanical seal** and camshaft rear oil seal.

*Drift in the shaft drive crankcase bearing (you may find this easier to do whilst the casing is still hot) from the inside outwards, and fit a new shaft drive oil seal flange (right).

Fit a new gearshift oil seal. This goes in from the outside, with the flat surface outermost (right).

Refit the stator and ignition sensors. The sensors each have **L** and **R** marked on them, as seen from the normal riding position.

The **R** one goes on the side nearer to the shaft drive bearing; the **L** one goes nearer to the gearshift aperture. The sensors have locating pins to ensure they are correctly aligned to the crankcase cover. Tighten the holding bolts to 7½ ft lbs.

Feed the thick cable through the narrow aperture and into the pickup ring area.

*Replace the pickup ring, paying attention to the alignment between the index mark and the slot in the upper casing.

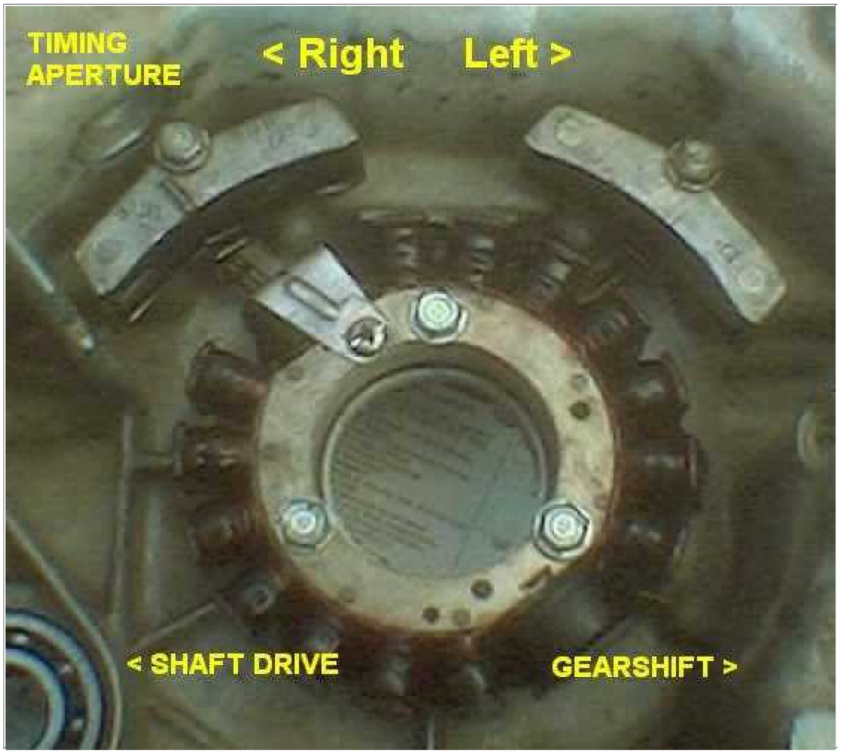
Reconnect the pickup ring.

Reinsert the thick cable's two grommets into their slots in the upper casing.

Use silicone sealant or a glue gun to inject sealant into both this area, and the connections between the ignition ring and the wiring harness.

Replace any damaged insulating tape at the base (engine) end of the thick cable.

Reconnect the neutral light lead.



General view (left) of reassembled stator and sensors inside the rear crankcase cover.

"Right" and "left" are as you would see them from the normal riding position.

I also use Hylomar or non-permanent gasket compound on both sides of the gasket; this is purely precautionary. It does help separation next time, though.

Fit the gasket to the engine centre section, with new O rings (left) around the water transfer passages. Don't omit the transfer pipes.

Smear a pellet of grease over the camshaft oil seal and refit the rear casing. Fit the 8mm and 12mm bolts finger tight and then check that the gearchange mechanism works, you will probably need to turn the engine by means of the 17mm crankshaft bolt on the front casing, just below the radiator.

In a diagonal sequence, tighten the 12mm bolts to 14 ft/lbs and then the 8mm bolts to no more than 6 ft/lbs.

Smear soapy water over the mechanical seal and refit the impeller with its copper washer and dome nut, don't forget the small thrust washer which fits between the flat impeller face and the rubber base of the ceramic seal. Be careful not to damage the ceramic "Polo Mint" part of the seal. Pictures of these components are on the **mechanical seal change** webpage.

Tighten the dome nut to not more than 9 ft lbs. I'd recommend 7½ as if this rather thin end of the camshaft snaps off, you are in serious trouble!

Using a new curly rubber gasket, refit the water pump casing. I also use Hylomar on this.

When refitting the rear cover, don't insert or tighten the bolts until the action of the gear lever is found to be correct. It's extremely easy to dislodge the gear level actuating teeth whilst easing the rear cover into place.

Refit the engine and you're done. After starting it, allow it to idle and then rev gently until warm, to check for leaks. It is common for a new mechanical seal to weep for a short while as the two ceramic faces bed in against each other.

You are welcome to **comment** on these pages.

Inside the ZAB Headlight Cowl

Anyone who has reassembled a ZAB headlight cowl will know that there is only one way the wires go back so that the headlight and ring can be fitted! the spaghetti inside the cowl has to be just right, or you can't get the headlight unit it.

Thanks again to ***Reg Worth*** who made the picture below, showing how it should all go back.

CX500 / GL500 / CX650 / GL650

Centre Stand Removal

(many thanks to Reg Worth who kindly gave permission to use this page when his own web site closed down.)

This information is given in good faith but you use it at your own risk.

This was one of those '10 minute jobs' which turned into a fretful saga. When stripping my CX to a bare frame it should have taken me a couple of minutes to remove the split pin and pull the pivot pin from the frame tube to remove the mainstand. HA! I should be so lucky.

The CX mainstand pivots on a tube (I call it the pivot pin) pushed through the frame and held by two clamps (left). The pivot pin was well and truly stuck in the stand tube.

Hammer ... hammer ... hammer ... no joy ... the pivot pin did not want to give up its death grip. It only comes out in one direction, and heavy hammering can peen over the end and jam it in the tube, making more work for yourself, leading to alcohol abuse, addicton and attendant miseries.

As I had an otherwise bare frame, I could safely use some heat from a blowlamp but it had no effect. (On an assembled bike, this may not be a wise option anyway).

I welded a steel bar to the pivot pin's wide end and tried to work it

loose but this just pulled the pin, bar and weld apart. Finally I remembered having a 20mm drill which had been turned down to fit in a 1/2" chuck and decided to drill away each end of the main pin to at least get it off the frame

The pivot pin is actually only about 19mm at its widest and I knew that I'd be enlarging the hole at the clamps a bit, but frankly I didn't care.

I just wanted it off!!!! it was getting personal.

On reflection. I think an 18mm drill bit would be the best size to use. Anyway I drilled away the pivot pin at each end until I reached the stand's tube. Then I could get the stand free of the frame.

Next job get the pivot pin out of the stand tube. I used my trusty old hacksaw and a new blade to make a lengthways cut inside I was prepared to make a few more cuts weaken the pin enough to be able to drive it out but luckily, one (with some moderate hammering) was enough.

When I had about an inch protuding, I used Stilsons to work it free then a chisel to lever the Stilsons longways while turning. Finally I had the pivot pin out!

I put the pivot pin in the frame clamps and could see that they gave me enough leeway to grip a new pin without serious modifications. Possibly some minor filing between the jaws of the clamps, that's all.

Naturally I shall use LOTS of grease on re-assembly! I tested the stand by putting it into gear and leaning it against a wall. I made sure that when the stand moved the inner pivot pin stayed still, as it should. I suggest you check and thoroughly grease yours, and keep it as a "10 minute job"

CX 500 A/B/Z/Eurosport Frame Measurements

Whilst I had access to a pair of Z/A/B and Eurosport frames, I measured up the distances between the engine-to-frame bolt holes. There are differences between the two, showing that mounting a Eurosport engine in a Z/A/B frame, or vice versa, is no easy task.

Apart from coping with the different frame mounting points, there are very significant other problems, such as:-

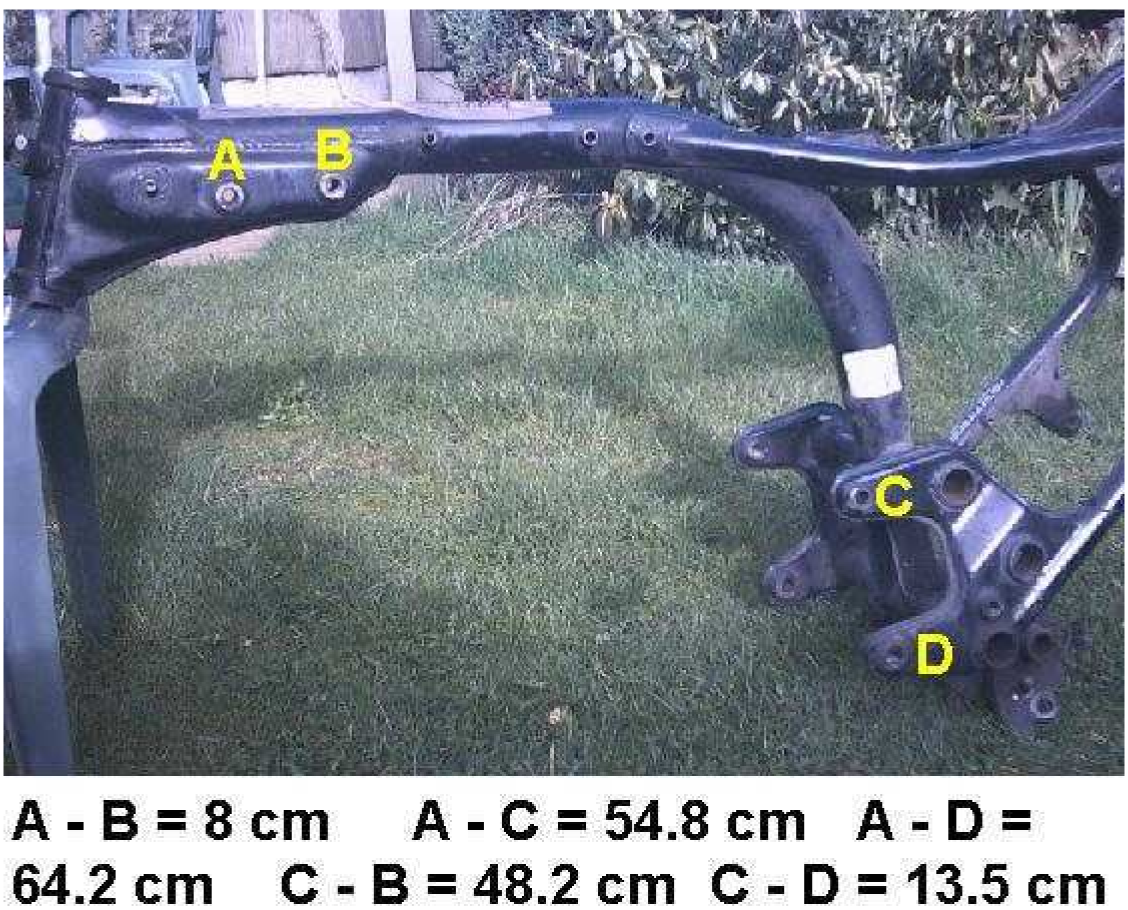
- the Euro engine being a tad longer than the ZABC;

- the Euro has transistorised ignition and the ZABC has CDI, which is entirely different;

- the ZABC engines have a top mounting bracket just forward of the carburettors (the "triangle plates") which physically will not fit in the Euro frame, unless the Euro rear casing is fitted, which means drilling a hole for the manual cam chain tensioner locknut and somehow arranging for the ignition pickups to work.

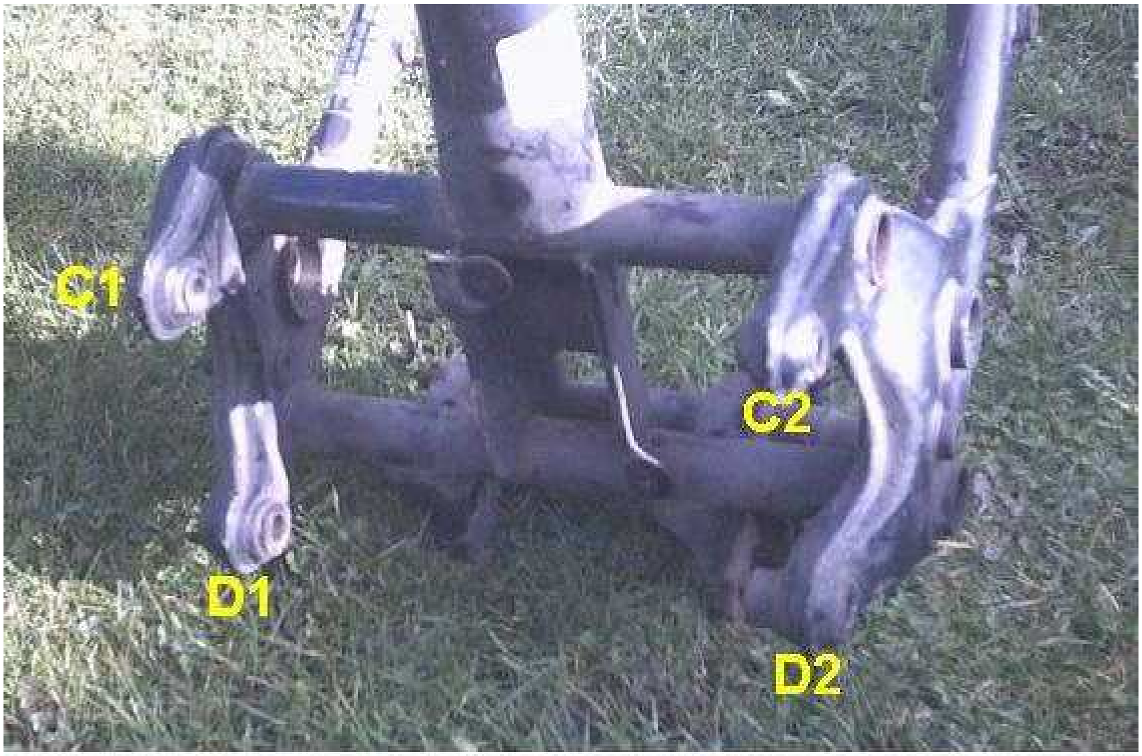
But - I know it ***HAS*** been done, because I've seen a 500 ZAB with a 500 Euro engine.

However, these photos may help anyone contemplating the task.



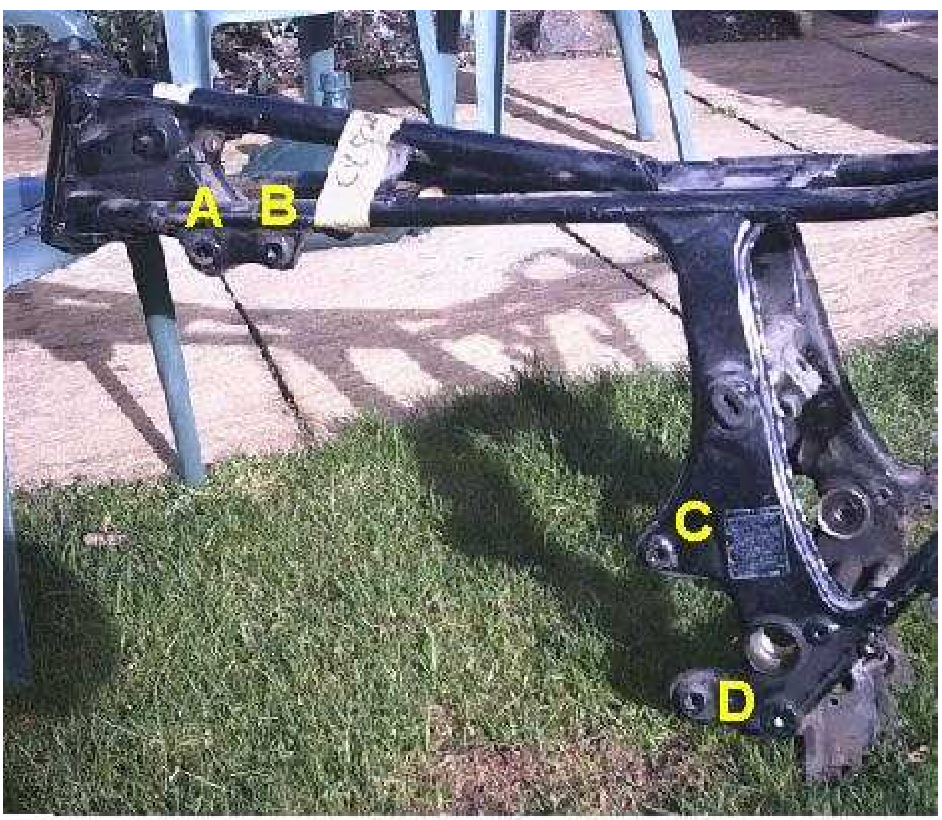
ZAB frame showing the 6 mounting holes and the various distances.

Closeup of the rear subfrane



C1 - C2 = 23.3 cm D1 - D2 = 22 cm

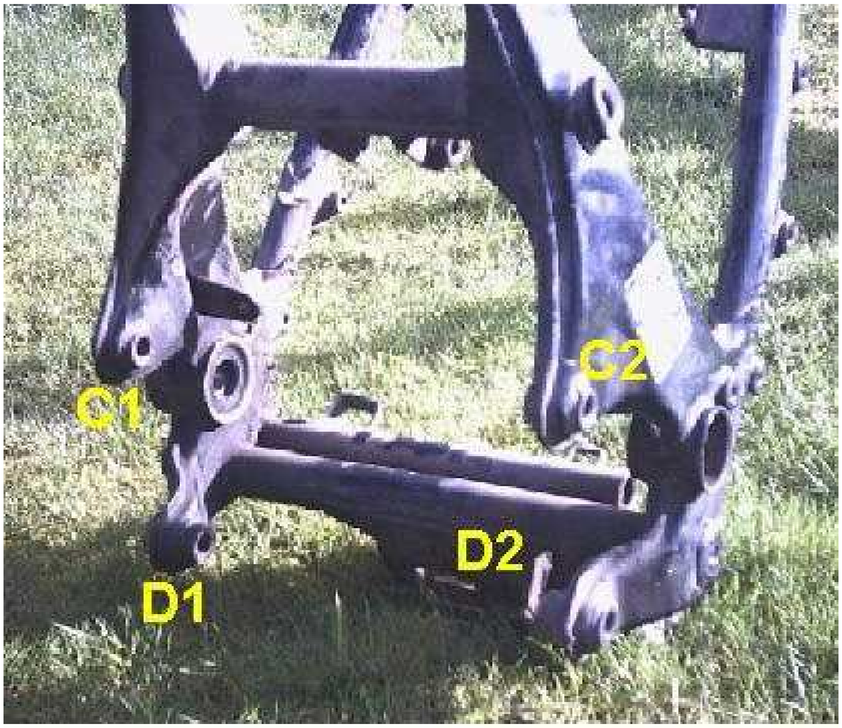
mounting points. These appear very similar, or identical, to the Eurosport rear subframe.



A - B = 7cm. A - C = 49.5cm. A - D =

Comparable photo of the Eurosport frame. Note the absence of the triangle plate mountings.

58.5cm. B - C = 33.5cm. C - D = 13.5cm.



Eurosport rear subframe.

C1 - C2 = 23 cm D1 - D2 = 22 cm

For the 650 Eurosport, the measurements are:-

A-B 7cm
A-C 49.5cm
A-D 58.75cm
B-C 43.5cm
C-D 13.5cm &

DISTANCE APART

C1-C2 23.4 cm
D1-D2 22.2 cm

Thanks ro Pete Harker for these figures..

You are welcome to **comment** on these pages.

CX / GL 500 / 650 Forks and Fork Seals

This page will show you how to remove, examine and replace the front fork oil seals on your CX or GL.

Skill levels explained.

Skill Level : 2. **Dirty Level** : 2. **Work Mess Level** : 2. **Tools level :** 3 and use a **torque wrench**. **Space required** : 2

Time : *Expert* 2 hours; *Average* 3 hours; *"First-time"* a half day.

All nut and bolt sizes are given for the spanner size required to fit them.

Many thanks to ***Carl McNamee*** (left) and ***Laurent Perron***, who provided the high quality digital photos used in this page. Carl says *"I'm the dorky looking guy with the beard!"*

Words : Rob Davis

The bike used (left) was Laurent's (American) GL500. Note that it has air forks, and that its lower fairing section had to be removed. There are differences between this model, the CX500Z/A/B and Eurosport models. Don't panic if the photos don't match your variant - but I advise that you have a workshop manual to hand, to illustrate the differences.

I am very receptive to comments and suggestions, but ***you use these pages entirely at your own risk.***

Removal Procedure

Place the bike on its centre stand on a firm surface and turn off the ignition. Jack up the engine securely (right) so that the front wheel is well clear of the ground. It's recommended to disconnect the battery, but this is not essential.

If your bike has a fairing, remove its lower section.

Unbolt and remove the bolts holding on each brake caliper (left). Each caliper has two 14mm head bolts holding it to the bottom of the fork leg.

Support the brake calipers on lengths of cord, or as in this case, bungee elastics (right). Don't let them hit the petrol tank and damage it, and ensure that they are kept out of the way of your working area.

Disconnect the speedometer drive cable at the bottom of the LH fork leg (left) and pull it out from the fork. Loop or tie it out of the way.

The retaining crosshead screw can be stubborn and you may have to use an impact driver to get it out.

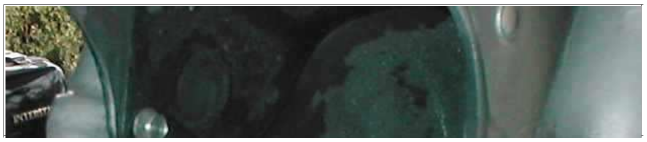
Remove the split pin or R-Clip from the front axle castle nut, and remove it. Undo the two holding bolts which clamp the wheel axle in place into the split half of the bottom of the LH fork leg (right). Some variants have this split bottom on both fork legs; some on only one of them.

Using a soft mallet, knock the axle through from the side the castle nut was on, towards the other side, and the front wheel will drop out (it's surprisingly heavy). Don't lose the small annular gear which drives the speedo cable, and give its insides a good dollop of grease.

Close-up of the split fork end. There is an arrow cast into it which shows you which way it goes back; the arrow faces forward.

Replace all bolts and washers finger-tight, so you don't lose them.

Remove the bolts (right) which hold the mudguard to the fork leg, and pull away the mudguard. Give it a good clean especially the underside, where muck collects. If it's a metal or chrome mudguard, spread



a generous amount of plain grease all over its underside, working it well into the cavities. This will stop it rotting.

On many variants, the mudguard has an integral underbody strengthening arch which also acts as a fork brace. If this rots or rusts, the rigidity of the front forks is seriously compromised and will adversely affect the bike's handling. If you are in doubt that the mudguard is good, fit a new one.

Some variants (with plastic or glass fibre mudguards) have a genuine fork brace fitted; if so, remove it.

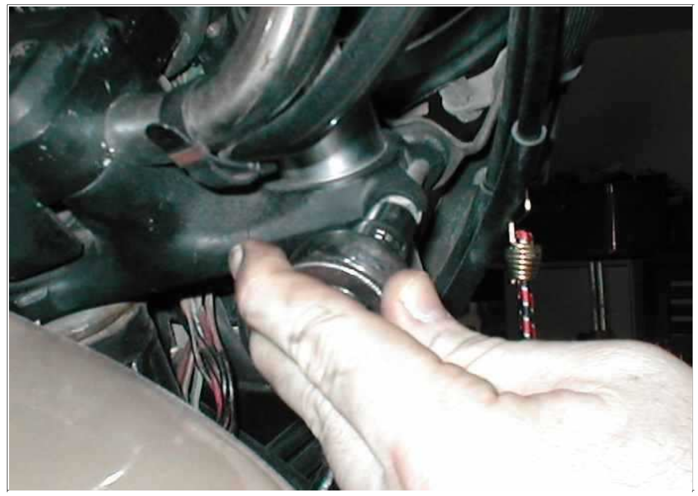
Brent Evered comments : *"One suggestion I had, was that you might want to remove the caps from the tops of the fork tubes while they are still on the bike, since it provides you with a built-in vice. Same with re-installation: wouldn't it be easier to put the forks into place first, then install the oil, springs and top caps? I haven't done this job on the 500 yet, but I've done it on a couple of other bikes, and it never occurred to me to wait until the fork tubes were off the bike to remove the caps and springs, so it may be that you are aware of something I haven't thought of. (Certainly wouldn't be the first time!)"*

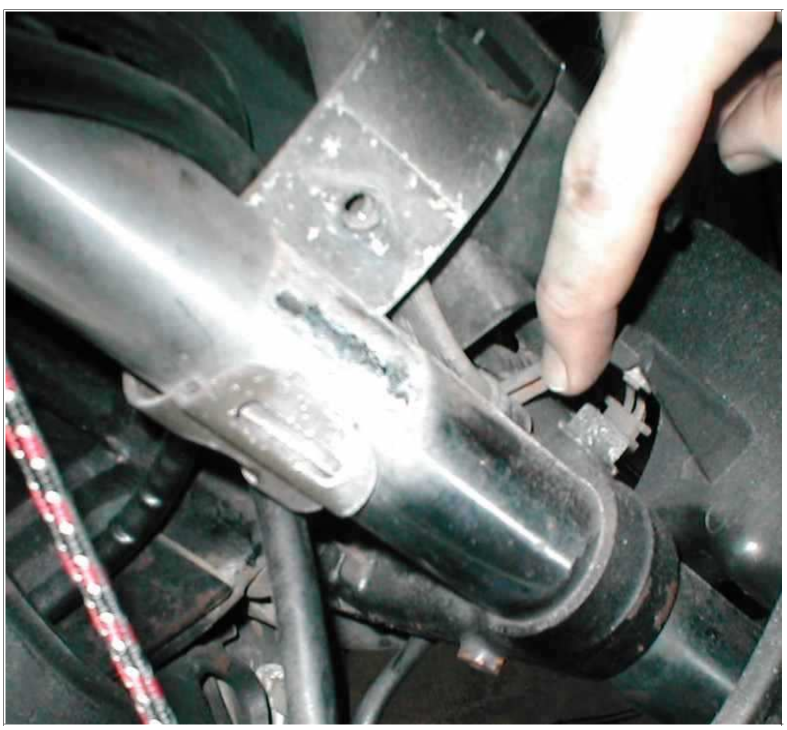
This strikes me as being a good idea, especially if you don't have a workbench and a vice. BUT there is a danger of crushing the fork tubes out of their natural circle shape - so don't remove the fork caps if you use this method, as they'll help keep the forks in their correct shape.

Remove the electrical connections box (left) from its brackets. There's no need to disconnect anything, but you need these clamps off (right) to be able to drop out the forks. On regular CX500s, this job isn't necessary, as the connections are inside the headlight shell.

Loosen the RH fork top air balance pipe (left) and then the LH one.

Fully slacken the pinch bolts at the top of each fork yoke (right) and the pinch bolts on the lower section of the fork yoke (below).





Grasp one fork leg firmly and twist or wriggle it out of its mounting. They can be a stubborn fit; if you have trouble, try a soft strap wrench (NOT a chain wrench) and squirt WD40 or releasing agent around the mounting and pinch bolt areas, and then use a soft mallet to dislodge the fork leg.

Be careful and don't try and separate the pinch bolt slot on the fork yoke, as if you break or split it, you will need to replace the entire steering yoke.

When both fork legs are out, clean them throughly as they also tend to collect rust and corrosion.

The next steps apply to each fork leg in turn. Don't work on both legs together, as it's best not to mix up the left and right fork leg parts.

Here is a closeup of the top of a fork leg, showing the white air suspension cap and the feeder aperture to the other fork leg. These caps unscrew, but they can be very stubborn, partly because they get stuck, and also because they are under some tension force from the compressed spring inside the fork leg.

Unscrew the cap carefully and don't get your face or eyes in the way, as the cap may well shoot off suddenly as it comes fully unscrewed.

If it will not budge, try applying a gentle local heat source (right) to free it up.

Once the cap is safely removed, the spring is exposed (left) and you can remove it (right)

Then extract the large bush (left).

You'll need a receptacle in which to drain the fork leg damping oil. Here, the fork leg was held in a vice over a drain pan

(left) and then shaken out (right) until all the oil was gone.

The damping oil is an awful light grey colour - don't worry - this is normal.

Invert the fork leg and remove the Allen retaining bolt from the underside (right).

Now prise off the top dust caps (left). Be careful of damaging the lips in the cast aluminium alloy fork leg.

Using a proper circlip tool, remove the holding circlip (right). Once this is out, you will see the fork seal.

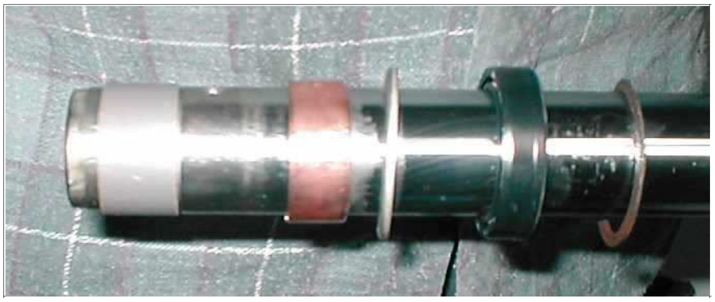
Now the two halves of the fork leg should come apart (left). The seal is the black ring.

Sture Lindberg says *"The fork legs are usually quite difficult to separate. Try using one as a 'hammer' against the other."* What he means is to push the legs together, then pull them apart quite forcefully.

Observe the top bush (right).

Clean all the component parts and replace any which are warped, scored or damaged. It's always best to replace the seals.

Carl says *"In addition to checking the fork bushings for* *scoring, warping and damage, I also check that the teflon has not worn through. If, on the teflon side of either bushing, you can see any copper then both bushings should be replaced. If the worn bushings are not replaced they will create slop in the front forks which will translate into a vague or strange feeling while steering."*



The complete assembly looks like this (left). The seal is the thick black ring.

During reassembly, a steel collar (left) was used to press in and assist the correct placing of all the components, before the circlip was replaced (right).

Sture Lindberg gave a good hint. He says *"I recommend a short section of rigid plastic drainpipe, slid over the top fork leg, as a collar. The plastic drainpipe can be hit with your hammer to push the seal into place, without any danger of damaging it."*

Replace the underside Allen holding bolt (right). Tighten to 11-18 ft lbs (1.5-2.5 kg/m).

Now measure out the correct quantity of damping oil. Use either Motorcycle Fork Oil or Automatic Transmission Fluid (ATF) in the following quantities:-

CX500Z, A, B 1978, 1979; CX500C, D 1979, 1980 : 135 cc in each fork leg.

CX500 C 1981, 1982 : 220 cc in each fork leg.

CX500 D 1981 : 185 cc in each fork leg.

CX500 EC (Eurosport) : 265 cc left leg and 250cc in the right leg.

All GL500, GL500D and GL500I : 210 cc in each fork leg.

CX650C : 480 cc in each fork leg.

CX650 E-D (Eurosport): 290 cc left leg and 275 cc right leg.

GL650, GL650D2-E, GL650I : 275 cc in each fork leg.

Measure out the correct amount of oil (right). Do not get this wrong, or the handling of your bike will be adversely affected.

Pour in the oil into the top of the fork leg and allow a short time for it to settle. Pour it slowly so that it doesn't overflow - if you lose some you will have to empty the fork leg out and start again.

Replace the spring (left) and the new seal, bushes and washers (right).

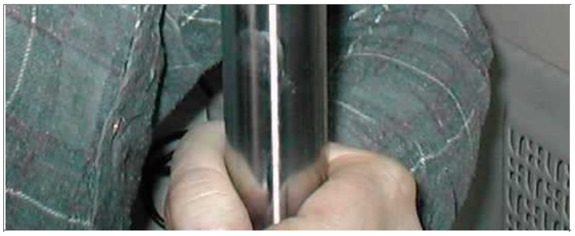
Compress the spring and replace the top caps (right). This can be a struggle, so another pair of hands, or a vice, will probably make the job much easier.

It's actually much easier to get the caps back on after the forks have been refitted. Jack the engine so that the front wheel is clear of the ground and 'hanging' free, with minimal tension on the springs.

Repeat this with the other fork leg.

Jim Weill says *"[with the fork leg out of the bike] I used a doorway to help me compress the spring. I put the fork cap over the spring, then pushed upwards and then screwed the cap on once the spring was compressed enough. After a couple full turns the cap can be "finished off" away from the door frame. The air pressure cap on the right hand one will have to come off though, because the fork cap needs to be flat so that*

you can push against it to compress the spring."



Replace the forks in the yokes and reassemble the mudguard etc in reverse order to disassembly. Don't fully tighten ***any*** of the bolts until everything such as mudguard, wheel, brake calipers etc are connected, as you may need to wiggle the forks to get bolt holes to line up.

Grease the axle well prior to insertion. Note that the split fork bottom has the forward-facing arrow, and the holding bolts do not completely close the gap when they are tightened; leave the gap at the rear.

To reinflate the air suspension (where fitted), attach a bicycle pump and inflate according to the chart below. DO NOT use a compressed air line as it is too powerful and will probably blow the seals.

Air suspension pressures (whilst the forks are cold and fully extended); CX500C 1981, 1982, CX500D 1981 10-16 psi (0.7-1.1 kg/cm). CX500EC, all GL500D and I, 11-17 psi (0.8-1.2 kg/cm). CX650C, CX650E-D, 0-6 psi (0-0.4 kg/cm). GL650, D2-E, I, 6-17 psi (0.4-1.2 kg/cm).

As soon as everything is in place, you can fully torque down the steering yoke pinch bolts.

Torque wrench settings:-

Steering stem nut : 65-87 ft lbs (9-12 kg/m)

Steering yoke TOP pinch bolts for CX500Z, A, B, C, CX650C : 6.5-9.6 ft lbs (0.9-1.3 kg/m). Other models : 6.5-11 ft lbs (0.9-1.5 kg/m)

Steering yoke BOTTOM pinch bolts for CX500Z, A, B, C, D : 13-19 ft lbs (1.8-2.5 kg/m). For CX500 Eurosport, D-C, all GL650s 22-29 ft lbs (3-4 kg/m). For CX650Cs, 32.5-40 ft lbs (4.5-5.5 kg/m).

Fork top plug : *without* air damped forks, 32.5 - 40 ft lbs (4.5-5.5 kg/m). *With* air damped forks, 11-22 ft lbs (1.5-3 kg/m).

Air hose connections : RH 11-14.5 ft lbs (1.5-2 kg/m); LH 3-5 ft lbs (0.4-0.7 kg/m); hose connections 3-5 ft lbs (0.4-0.7 kg/m).

Caliper-to-fork-leg holding bolts : single piston calipers 11-14.5 ft lbs (1.5-2.0 kg/m); twin piston calipers *TOP or front BOLT* 18-22 ft lbs (2.5-3.0 kg/m), *BOTTOM or rear BOLT* 14.5-18 ft lbs (2.0-2.5 kg/m).

General 10mm head bolts : 6-9 ft lbs (0.9 - 1.3 kg/m)

General 12mm head bolts : 11-14 ft lbs (1.6-2.0 kg/m)

General 14mm head bolts : 13-18 ft lbs (1.8-2.5 kg/m)

You are welcome to **comment** on these pages.

CX/GL 500/650 Rear Wheel Removal

Drum (Z, A, B, C, D) and Disc (500 Eurosport, all 650s, Turbos) Rear Brake Models

This site tells you how to remove the rear wheel (and drum brake, if fitted) from your CX/GL, and replace them. I am very receptive to comments and suggestions, but you use this information at your own risk.

All the tools, hands and the bike in the article belong to the author.

All nut and bolt sizes are quoted as the spanner size required to fit them.

Skill Levels explained.

Skill Level : 1½. Personally dirty : 2. Work mess : 1. Tools : 1. Space : 1.

Tools : 10mm, 12mm, 14mm, 22mm ring or socket spanners; socket ratchet handle and extension arm; rubber mallet; torque wrench; wire brush; grease; pliers.

Time : **Expert** 10 minutes, **average** 15 minutes, **"first time"** 20 minutes.

Allow the bike to cool so that the exhaust system is cold, or at least, cool enough to touch.

As you may have to remove one or both silencers, you might need to make new 'asbestos h-box gaskets'. There is a very simple way to do this, it's on the ***Tips and Tricks*** page.

Park on the centre stand on a firm surface. The operation is greatly aided if the left hand silencer is removed to improve access; but this isn't strictly necessary. However, some 2:1 aftermarket exhausts which have the silencer on the left hand side may need loosening or removing.

In order to improve clearance for the wheel during removal, it's a good idea to fully deflate the tyre, as this does make things easier.

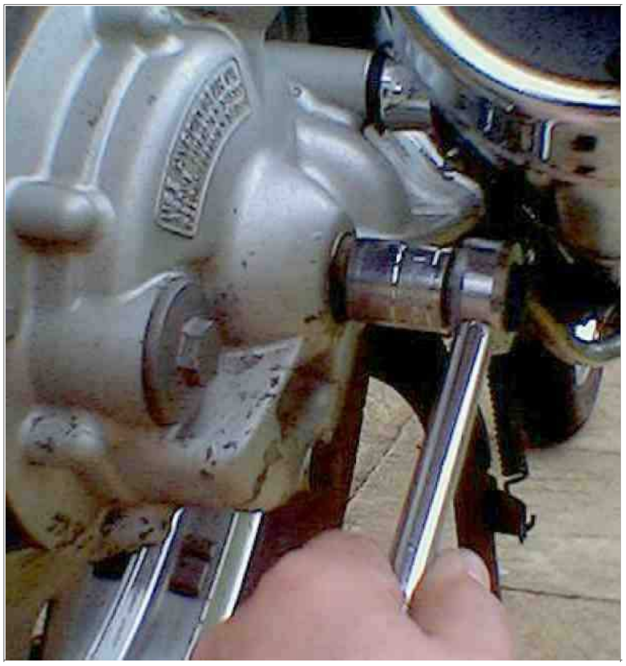
DRUM BRAKE MODELS

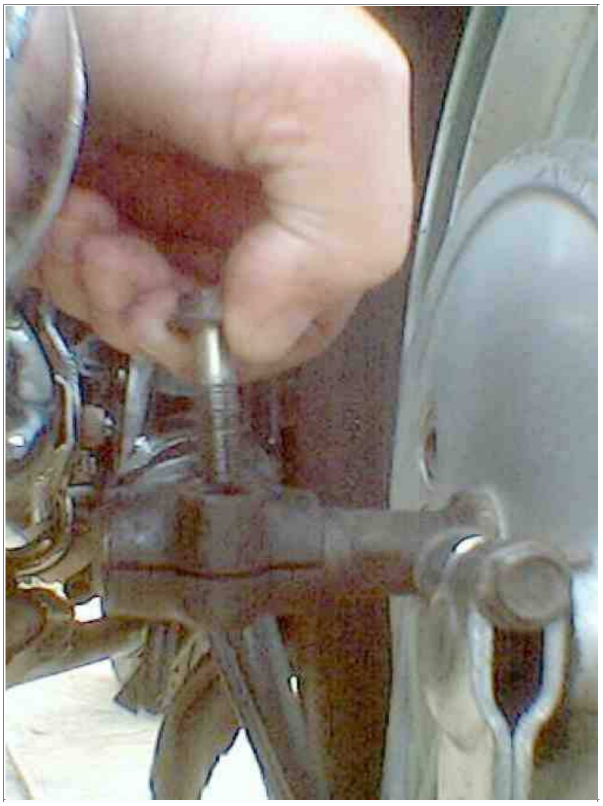
Remove the split pin or R-clip from the brake drum torque arm (left) on the lower left hand part of the rear wheel hub, undo the 10mm nut and prise the arm away from the bottom of the brake drum assembly. Don't lose the thick rubber washer which is between the arm and the hub.

Remove the brake lever arm's adjusting nut (right) from the end of the actuating rod, and slide the lever off the actuating rod, don't lose the spring which sits between the rod's shoulder and the brake lever arm. The brake drum should now be free to rotate around the axle.

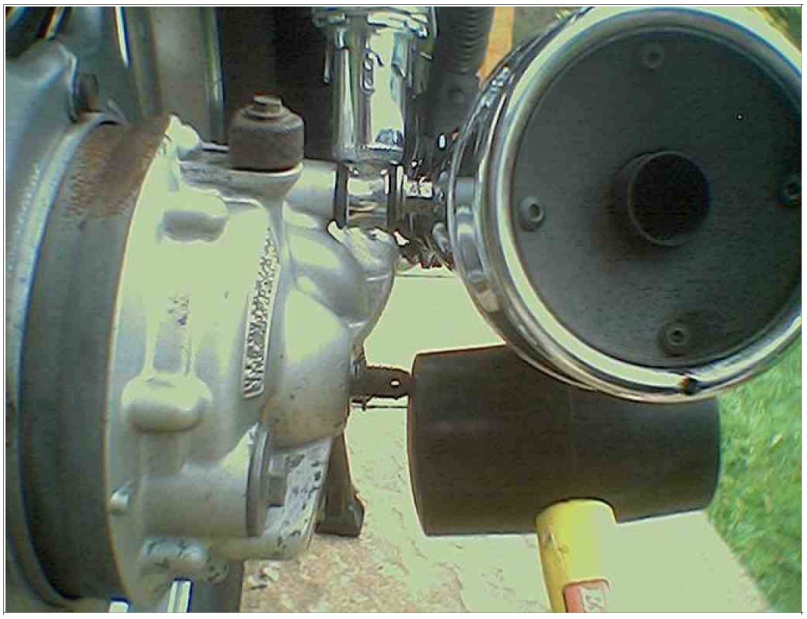
Remove the split pin or R-clip from the castle nut on the right hand side of the axle (left). ***This is the same on both drum and disc brake types.***

Remove the 22mm head castle nut and thick washer (right). ***This is the same on both drum and disc brake types.***





Undo and remove the 12mm pinch bolt at the rearmost part of the swinging arm, on the left hand side of the bike. ***This is the same on both drum and disc brake types.***



Knock out the axle from right to left. If you don't have a rubber mallet, use a block of wood between a normal hammer and the end of the axle.

Depending on what exhaust system you have, you may find that the silencers are in the way. Either remove them, or undo the top or bottom suspension bolts, to allow the swinging arm to drop lower and clear the exhaust system.

If the axle sticks, poke a broad bladed screwdriver into the slot right at the end of the swinging arm, where the pinch bolt fastened. Tap the screwdriver in ***gently***, to open the gap a little.

This is the same on both drum and disc brake types.

Axle (left) coming clear of the brake drum and swinging arm. Note the shaped washer. ***This is the same on both drum and disc brake types.***

Pull out the axle (right) and don't lose the shaped collar which is located up against the brake drum. The rear wheel should now pull towards the left hand side of the bike and simply drop off the drive mechanism, and fall to the ground.

You may have trouble in wriggling out the rear wheel from the restricted space between the rear mudguard, tail cone unit and swinging arm.

Try lifting the bike by its rearmost part (rack, top box or grab rail) to increase the

clearance, or jack up the bike from under the engine, to give a little more clearance.

It can be a tight squeeze to get the wheel free. If all else fails, remove the left hand silencer to give you more room to work. This will, again, often depend on what exhaust system your bike has fitted. You can also deflate the tyre.

Edvard Korsbt says *"I have found on my GL650 with drum brakes, that it is nessecary to loosen the drive hub unit to be able to get the tyre out. It's not enough to deflate the tyre. If you loosen the drive hub (takes 1 minute extra) the rear wheel is easily taken out. Without its impoosible on my bike, which has totally standard dimension tyres."*

Patrik Blommaskog adds "*When removing the rear wheel as described on your site, like Edvard Korsbt on his GL650, I found that it was not possible to get the standard dimension tyre past the drive hub unit. Loosening the three drive hub nuts about 4 mm (removing the right hand silencer first for access) enabled me to wriggle the wheel out."*

Once the rear wheel is out, the brake drum lifts away. Beware of inhaling brake dust. Take the drum brake outside, lay it down with the "drive" side uppermost, and tap it firmly to dislodge any dust or debris.

Check the wear on the shoes, and replace them if necessary (a future webpage will deal with this); the minimum thickness is 78/1000" or 2mm.

Refitting is a reversal of this procedure. Chet comments that you should *"loosen the three nuts holding the final drive in place before tightening the [castle nut on the] axle with the wheel. This lines up the splines correctly, improving wear. These three nuts will then be the last ones to tighten making everything mate up correctly."*

Grease the drive splines well (left) before

reassembly, as excessive wear between the wheel and the drive hub means a difficult and expensive repair.

The splined flange in the rear wheel hub unbolts with the 5 bolts you see here, and can be easily replaced. If anyone has pictures of replacing the splined part of the differential, I'd be grateful to receive them. Does the differential splined flange unbolt in a similar way, or is it part of a larger unit?

This is what happens if you don't grease these splined flanges. Notice that the splines have almost completely worn away.

Shudder .... I wonder what kind of awful noise this was making?

It should look like this.

Grease the brake adjusting mechanism and after reassembly, ensure that the rear brake works correctly. This is ***NOT*** something

you want to discover on a road test!

Torque Settings

CASTLE NUT : CX650 Custom and Eurosport 43-58 ft/lbs (6-8 kg/m); all other Pro-Link variants 36-58 ft/lbs (5-8 kg/m); all other variants 40-47 ft/lbs (5.5-6.5 kg/m).

Pinch bolt 14½-22 ft/lbs (2-3 kg/m).

***Disc* rear brake mounting bolts** 7-9 ft/lbs (1-1.2 kg/m)

***Drum* rear brake torque arm nuts** CX650 Eurosport 13-20 ft/lbs (1.8-2.8 kg/m); all GLs and 650 Custom 11-18 ft/lbs (1.5-2.5 kg/m); all other variants 11-16½ ft/lbs (1.5-2.3 kg/m).

Differential unit retaining nuts (3 or 4 nuts depending on the model) 33-44 ft.-lb.

Drum Brake Adjustments

Adjustment of the rear drum brake after reassembly is as follows. With the brake at maximum pressure, the chromed brake lever should never be further forward vertically than the wheel axle. If it is, either the brake shoes are worn out, or the brake lever is incorrectly sited on the splines at the brake drum. There is a punch mark on the chrome lever which aligns to a similar mark on the splined shaft. Some owners resort to unbolting the brake arm and moving it round, in a ploy to extend brake life. However as rear wheel removal is so easy on the CX, it's a simple matter to replace brake shoes rather than apply this cheat.

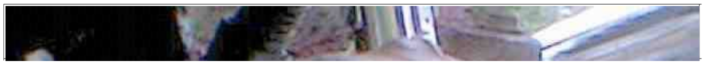
Footbrake Lever Adjustments

How the footbrake lever sits in relation to your toes is largely a matter of personal choice. I like the footbrake pad height not quite touching my right toes when riding normally, and with about 1/3" of free play before the brake begins to bite. To adjust this, look underneath the bike on the right hand side and locate the adjusting screw. Slacken the 10mm locknut and then screw in or out the stop-screw until the footbrake lever is at the desired height. Then tighten the locknut.

If the height cannot be adjusted by means of the stopscrew, unbolt and remove the footbrake lever from its spindle, and move it round as necessary, one spline at at time. Then use the stopscrew for fine adjustments.

I recommend fitting new split pins where necessary, but R-clips are a much better proposition. Your local bike or spares dealer should have a selection.

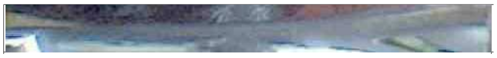
Additional Pictures



Drive hub unit, with the rear wheel removed.

General view of the bike with the rear wheel removed.

Correct location of the collar, between the axle and the brake drum.



Inside the hub (right), into which the brake drum locates.

Brake drum, shoes, and mechanism (left).

DISC BRAKE MODELS

The procedure is very similar to the drum brake models, except that there is no brake torque arm to unfasten.

Remove as much of the exhaust system as you need to be able to

withdraw the axle from the left hand side. This probably means removing the left hand silencer.

Remove the split or r-pin from the axle's castle nut and remove that as well. Remove the pinch bolt on the left rear end of the swinging arm.

Remove the two bolts *(ringed, left)* which hold the rear brake caliper to its bracket. These pictures are from a 500 Turbo.

Without unfastening the hydraulic hose, pull the caliper upwards to clear the disc. If you have trouble with this, put strong pressure on the caliper face and push it inwards towards the wheel hub, this retracts the brake pistons. If this still doesn't work, slide a wide blade screwdriver in from behind the caliper and gently but firmly lever the caliper away from the disc.

Now knock the axle through from the right, as per the drum brake model, and withdraw it to the left.

Once the axle, space and brake caliper are clear, suspend the caliper so that it doesn't dangle and possibly damage the hose or paintwork. Wirebrush clean the caliper body and as much of the inner area as you can reach. You can use ACF-50 or light grease on the piston and moving parts area, but don't get any on the pads or disc surface.

Now swing the caliper

bracket upwards to clear the disc *(right).*

The Turbo has an aluminium spacer between the inside face of the swinging arm, I expect the other disc brake models are the same, please correct me if not.

The wheel can be pulled towards you off the drive splines and then wriggled out backwards and to the left. It is a tight fit and can be a struggle; extra clearance is possible by either removing the rear mudguard or having someone lift the rear of the bike an inch or two. If you do this be careful that the centre stand doesn't retract.

Also try completely deflating the tyre, as this does give extra clearance. Clean everything thoroughly before reassembly.

Refitting is a reversal of removal, grease the drive splines thoroughly as per the drum brake type.

After refitting, pump the rear brake pedal several times to restore pressure and re-align the disc brake caliper and pads.

You are welcome to **comment** on these pages.

Replacing a stripped thread on your CX/GL

This site tells you how to replace a stripped thread in any part of your engine or frame. In this example, two of the 14mm head engine-to-hanger bolt holes had stripped from the aluminium engine casting at the cylinder head and barrels. Another one stripped during the reassembly (Sod's Law in action). As a precaution, we replaced all four threads.

I am very receptive to comments and suggestions, but you use this information at your own risk.

Many thanks to ace spannerman Rick Hoad (Odie) of Derby, who did rather more than half of the work and showed me how to do the rest. The bike is mine.

[Skill Levels explained.]

Skill Level : 2. Personally dirty : 2. Work mess : 2. Tools : 1. Space : 1.

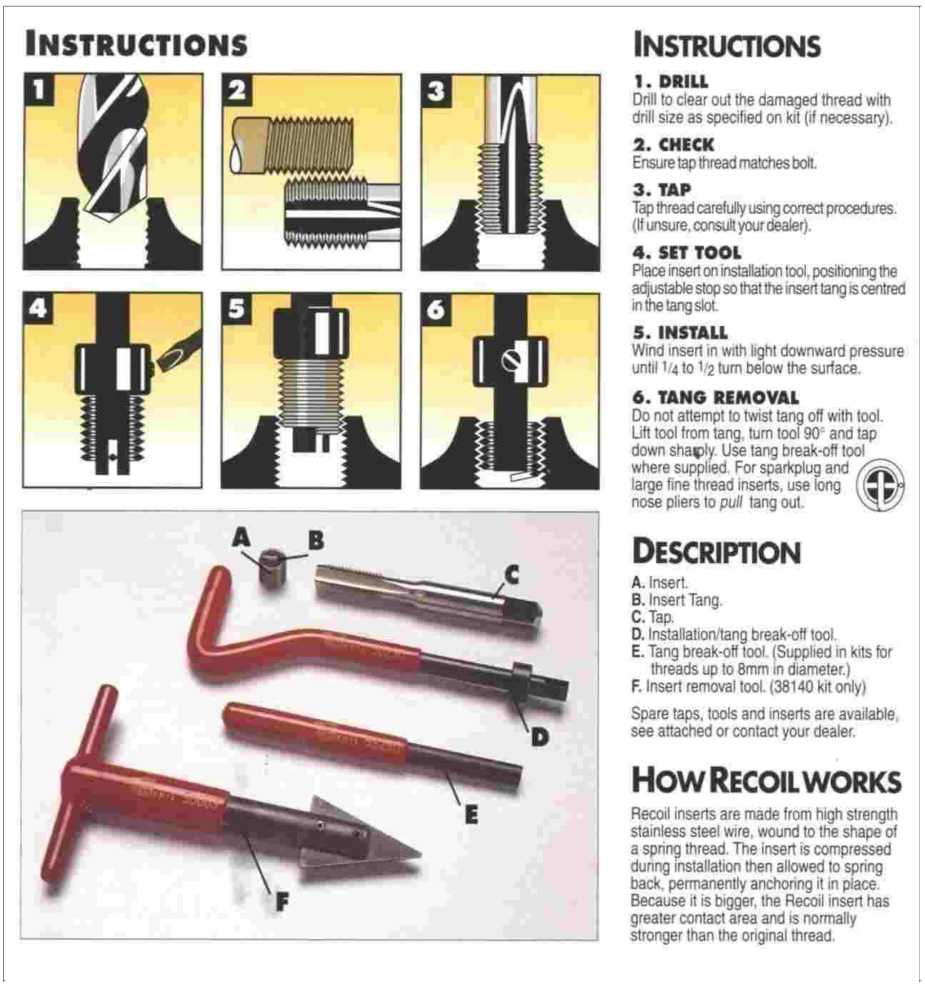
All nut and bolt sizes are given for the spanner size required to fit them.

Tools : whatever tools you need to be able to get at the damaged thread. In this example we had to remove the petrol tank, saddle, radiator shrouds, radiator with its circular cowling, and also the engine hanger, in order to be able to reach the aluminium engine bolt holes. This obviously meant jacking or supporting the engine, and also draining the radiator, but not the engine oil.

Picture (left) shows what the bike looked like before we were able to attack the actual rethreading.

Time : actually replacing the thread takes about 15 minutes each, once you can reach it.

You will need a special thread recovery kit for the size of threads in question. The kit I used was a "RECOIL" which contained the tapping tool, insertion tool and screw thread coils. Some kits also include a small tool to snap off the bottom tang of the inserted thread, but this isn't vital.



INSTRUCTIONS

1. DRILL
Drill to clear out the damaged thread with drill size as specified on kit (if necessary).

2. CHECK
Ensure tap thread matches bolt.

3. TAP
Tap thread carefully using correct procedures. (If unsure, consult your dealer).

4. SET TOOL
Place insert on installation tool, positioning the adjustable stop so that the insert tang is centred in the tang slot.

5. INSTALL
Wind insert in with light downward pressure until 1/4 to 1/2 turn below the surface.

6. TANG REMOVAL
Do not attempt to twist tang off with tool. Lift tool from tang, turn tool 90° and tap down sharply. Use tang break-off tool where supplied. For sparkplug and large fine thread inserts, use long nose pliers to *pull* tang out.

DESCRIPTION

A. Insert.
B. Insert Tang.
C. Tap.
D. Installation/tang break-off tool.
E. Tang break-off tool. (Supplied in kits for threads up to 8mm in diameter.)
F. Insert removal tool. (38140 kit only)

Spare taps, tools and inserts are available, see attached or contact your dealer.

HOW RECOIL WORKS

Recoil inserts are made from high strength stainless steel wire, wound to the shape of a spring thread. The insert is compressed during installation then allowed to spring back, permanently anchoring it in place. Because it is bigger, the Recoil insert has greater contact area and is normally stronger than the original thread.

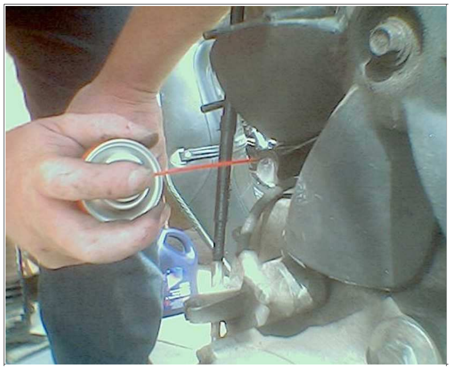
Full instructions (left) were inside the box lid.

The threads we were replacing were M10 1.25mm pitch thread for the 14mm head Honda bolts. These are also the same as the ones for the cylinder head bolts, so if you have been unfortunate enough to overtighten and strip one of these, this is the kit you need.

This page assumes that you are working on this 14mm head size bolt, so if your job is different, you need to adjust the text accordingly.

If the thread has completely stripped from the hole, and the bolt simply slides in and out, you don't need to drill out the hole. Otherwise, use a 10.25mm drill to clear out the remains of any of the old thread.

Give the hole a thorough squirt of WD40 to clear out any debris or dirt.



The tapping piece (left) is what you use to cut a new thread into the metal. It has a generous tapered lead-in to aid correct insertion into the damaged hole.

It is strongly advised to use a tap holding tool rather than a socket or adjustable spanner, to hold the tapping piece. This tool is a T-handled metal bar with an adjustable centre hole, shaped to clamp onto the shank of the tapping tool, and adjusted by means of unscrewing one of it handles.

The holding tool makes it much easier to keep the tapping tool correctly aligned with the original hole.

Measure the depth of the hole and then taking great care to keep the tapping tool dead in line with the original hole, screw it in (right) until you can feel the tool's cutting edges begin to bite into the metal. Then, with occasional squirts of WD40, screw it in firmly for a half turn and then out for a quarter turn. This helps leep the cutting edges clear of metal fragments and swarf.

Every half dozen turns, unscrew the tool completely and use WD40 to blast off any accumulated swarf from the tool's head and body (left).

Continue the actions above until the tool has cut a thread all the way to the full depth of the hole, then unscrew it, with a turn out and a quarter turn back, until it comes free. Now squirt WD40 down the hole to clear out the debris and shavings. If you are working on an open engine, ensure that no swarf or shavings fall in.

Take the insertion tool and adjust the depth collar (right) to an appropriate distance according to the depth of the bolt hole, less any accessories such as thick washers or engine crash bars, etc. The depth collar just makes sure that you don't screw the insert in too far.

Take one of the new inserts and slide it over the end of the insertion tool (left) so that the tang engages with the slot cut in the end of the tool.

Offer up the insert to the freshly-cut hole and carefully wind it in. There is a slight spring resistance as the insertion tool does its job, and it beds the insert into the new threads. The depth collar stops you going in too far.

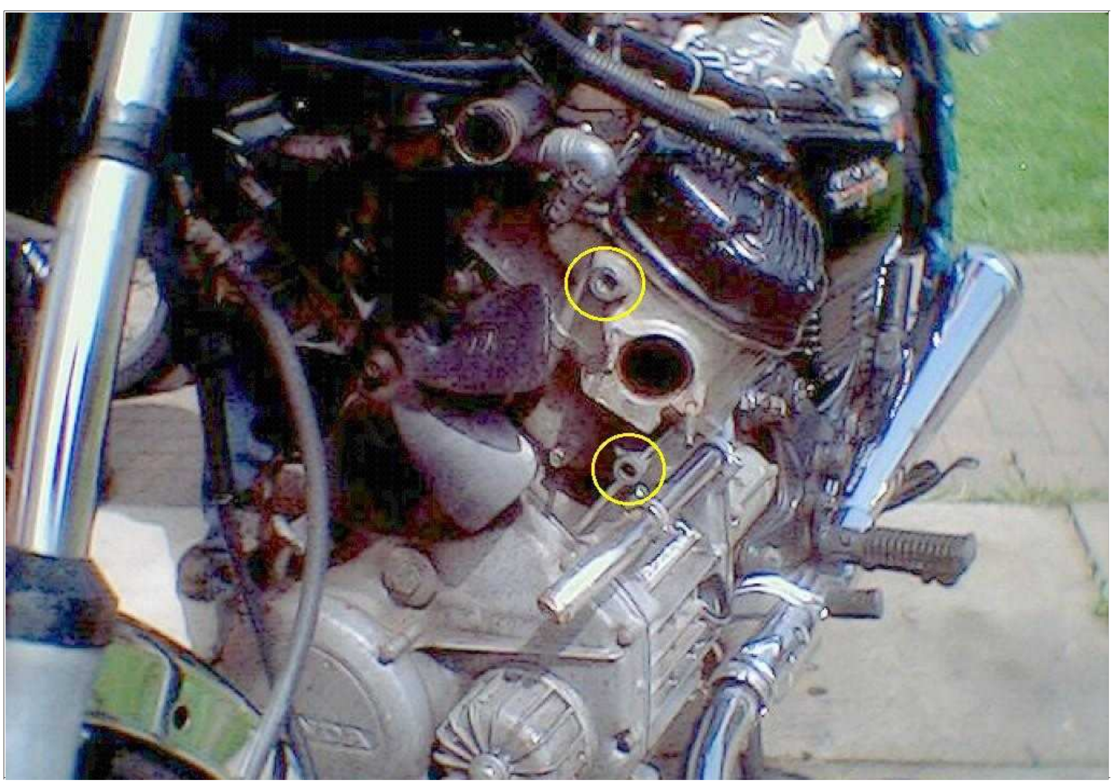
If you mess up, don't worry, use some pliers to pull out the spring-like insert, and start again with a new one.

When the insert is in right up to the depth collar, slacken the collar's locknut and give the insert another half turn. Then remove the insertion tool and use either the tang breaking tool which came with the kit, or a slim screwdriver, to break off the tang at the bottom of the insert. If you can, recover this tiny portion of metal from the bottom of the hole.

Now lubricate the bolt and it should screw in quite comfortably into the repaired hole. When you reassemble the bike, use whatever torque poundage was originally quoted for the bolts.

Additional Pictures (specific to this rethreading job)

Right hand engine barrel and cylinder head, showing the lower engine-to-hanger bolt hole. In this picture, the insert has just been screwed in, and you can just see the tang, which has yet to be broken off.



What we had to do to the bike to get at these engine hanger bolt holes on the aluminium engine.

The tank, saddle, radiator, shrouds and cowling are all removed.

The bolt holes we repaired are ringed, and we did both side of the engine; all four bolts. It seemed daft not to do all four, since two had

stripped, a third stripped during the reassembly but the fourth seemed ok.

You are welcome to **comment** on these pages.

Thanks again to Rick for a valuable lesson; I hadn't done this job before.

CX500 / GL500 / CX650 / GL650 Rear Hub Oil

Check / Change

This page shows you how to check the correct level, and optionally replace, the lubrication oil in the rear drive hub of your CX / GL motorcycle.

Skill : 1. ***Tools*** : 1. ***Personally dirty*** : 1. ***Work mess*** : 2. ***Space*** : 1. ***Time*** : 15 minutes.

All nut and bolt sizes are given for the spanner size required to fit them.

Skill levels explained.

Tools : 10mm, 17mm sockets; ratchet handle and extension bar; grease gun; replacement oil; torque wrench.

The capacity of the rear hub is 160 - 180 cc of ***Hypoid EP90*** gear oil.

DO NOT USE AUTOMATIC TRANSMISSION FLUID (ATF) OR STANDARD ENGINE OIL.

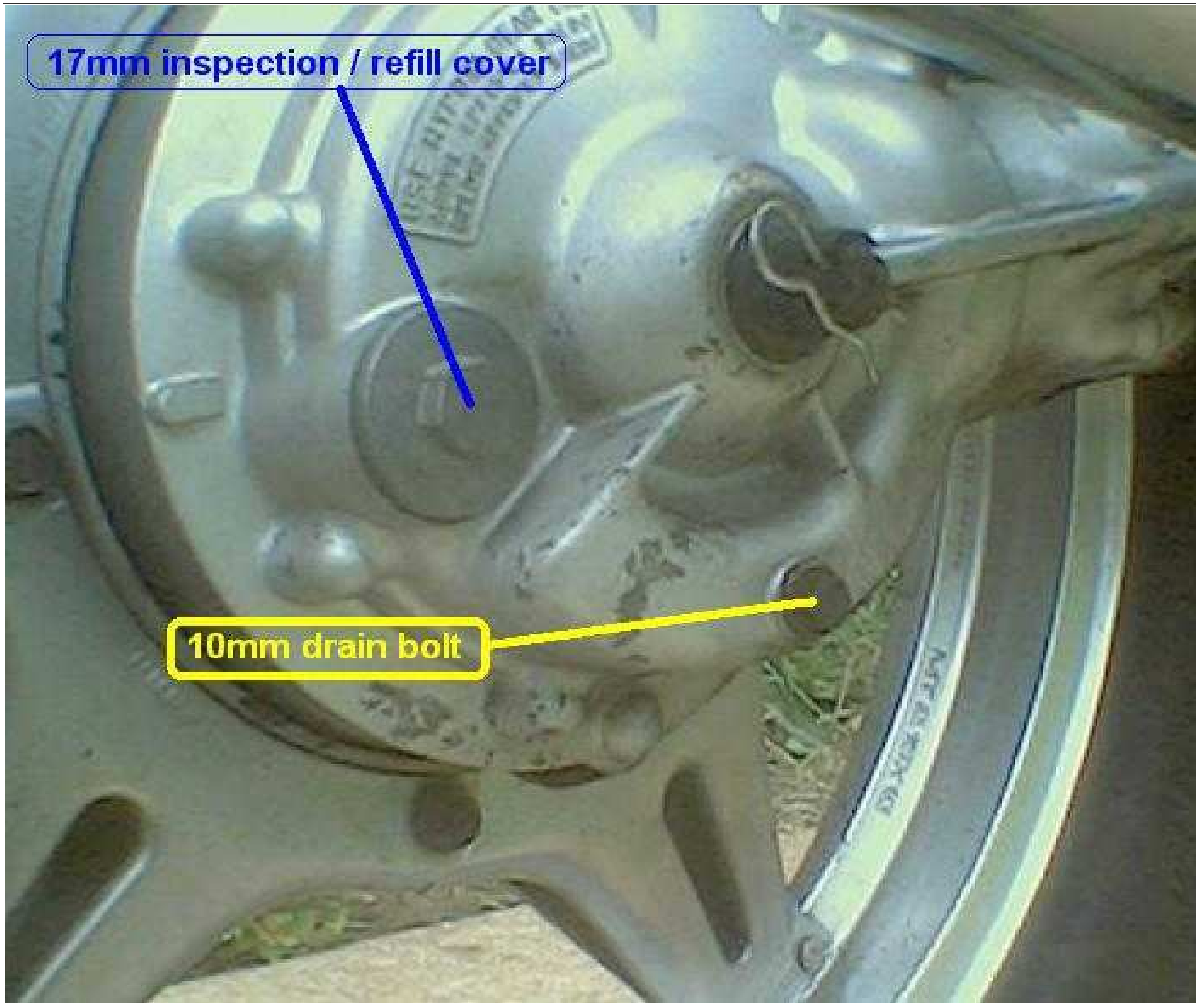
All the tools, hands, and bike in the pictures are the author's. I am very receptive to comments and suggestions, but you use these pages entirely at your own risk.

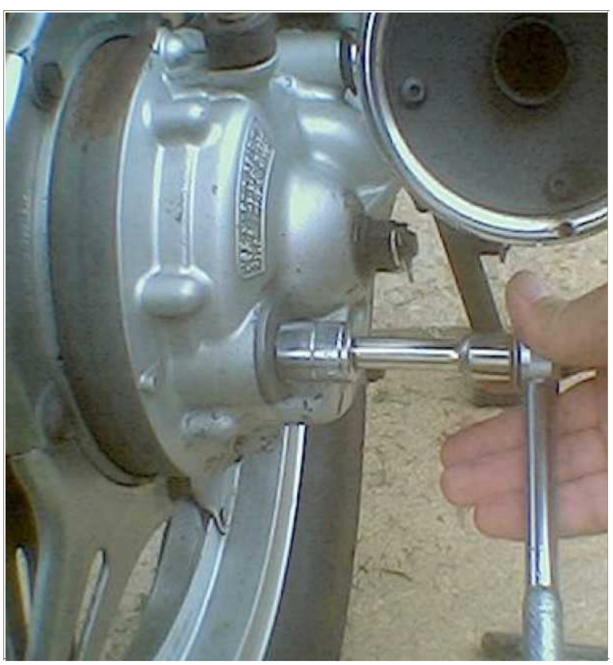
The CX/GL family has a shaft drive which requires lubrication oil in the rear hub. Checking the level and doing an annual oil change are the only maintenance jobs you need to do. Compare this with chain drive bikes, which need regular drivechain lubrication and expensive replacement chains and sprockets.

Honda recommend that you check the oil level with every engine / filter oil change but they don't make any recommendation about changing it. I suggest that you change the oil every year, or at the beginning of the "summer bike season".

Take the bike for a short run, to warm the rear hub and its lubrication oil.

General view of rear hub (below).





Remove the 17mm head inspection cover (left) - this is exactly the same as the one you unfasten to check the engine timing for a tappets adjustment job.

Once the cover is off, the level of lubricant inside should be up to the lowermost level of the inspection port (right).

If you're not going to change the oil, simply top up the level, as necessary, from your bottle, until the oil is just starting to overflow. Then replace the port cover, tightening to 6 ft / lbs.

Dave French says *"I find that to save spillage when removing the cap, rotate the wheel gently backwards, if the level is a bit high, it doesn't pour out over your tyre."*

If you plan to drain the oil and replace it, put a small receptacle below the hub and remove the 10mm head drain bolt (left) and allow the old oil to drain out.

Then replace the drain bolt and washer, tightening to 6-9 ft / lbs. Fill the hub until oil is just starting to overflow, and then replace the inspection port cover, tightening to 6 ft / lbs. The capacity is 160-180 cc.

Look and see if your model has a grease nipple (ringed, right) on the forward part of the hub assembly. This is fitted to 500cc models but older bikes may have had some parts transposed from another variant.

If your bike has a grease nipple, give it four pumps on the

grease gun (left) to lubricate the shaft drive mechanism.

Road test, check for oil level and leaks, and you're done.

You are welcome to **comment** on these pages.