



Honda CRF1000L mods

In issue #23 we rode a trio of Africa Twins and thought the stock suspension was good. Then we rode a couple where the suspension had been sorted and tuned by Nick Dole at Teknik Motorsport and we were amazed that what seemed a good stock set up could be improved so dramatically. Nick was happy to share what he's learned about Honda's dualsporter...

Words and images: Nick Dole

In the last 10 years, the DR650 was king of the hill in terms of the number of bikes where we upgraded suspension. That's changed in the last six months. We now do more of Honda's Africa Twin than any other bike. It's not because it's bad stock, it's just there's 400 bikes rolling off dealers' floors each year.

It's selling well, lots of people love them stock, and lots get modified.

We do everything from changing springs, modifying

OEM fork and shock internals, fitting Öhlins, Nitron and Andreani cartridges, to complete Öhlins forks, Öhlins shocks and now TFX shocks.

There are a lot of companies making AT suspension components.

Good call

How does a typical AT phone call go?

It's varied. Remember a LOT of people buy this bike and love it stock. I get everything from, "I read on the internet I should get it done," to, "I bottom it so



Above: The internet had a meltdown over AT upper fork tubes wearing off the anodising. It's not as widespread as the rumour mill would have it, but it happens.

hard I may be in need of spinal fusion soon." Clearly we are dealing with a wide range of riders and uses.

If the caller is lost, just wants an improvement but doesn't know why, asking what they use the bike for usually reveals why they are calling. Typical responses with my suggestions to no-cost remedies are:

* "The forks are too soft and dive a lot."

Okay, have you adjusted the preload? The stock fork has very little internal preload and you can make the fork sit a lot taller by winding eight to 10 turns on the blue preload adjusters on the fork tops. I'd suggest running the rebound adjusters on the fork caps at 1.0 turn out from full hard and the compression adjuster at the bottom five clicks out from full hard.

* "The shock gets hot and fades."

The AT has what I'd call a very active



shock. I've heard the complaint before and done shock dyno tests at 30 degrees to 120 degrees. The shock doesn't fade any more than any other shock. It's just the level of damping the shock provides stock is very low, so any heat diminishes the damping and you quickly get out of 'the window'. Try running your rebound adjuster at three clicks out from full hard and see if the problem is still there.

* "I have to run the shock preload at full hard all the time. I'm only 120kg. How could they have built a bike so soft?"

(Suppressing laughter) The manufacturer has to target a weight range when it builds a motorcycle. The stock rear spring isn't suited to a 120kg rider plus some gear. The shock's damping targets aren't meant for a stiffer spring so we're really looking at spring and damping changes.

So, what to do? Lets cover the OEM shock and fork because it's the most popular to modify.

Fork

The stock fork is a Showa 45mm USD unit. It's closer to a late-80's Honda motocross bike than a 2018 CRF450R, but that still puts it above, or at least on par with, its sales rivals. The stock springs are 0.54kg/mm – 0.56kg/mm progressive. That's not a bad stock spring to have. A few shock dyno runs and some riding unearthened who Honda designed the bike for. It's made to be comfortable and do everything. It's not supposed to be a CRF450R. The fork is approximately 30 per cent lighter in compression damping than a KTM 1190R while having a similar spring rate, so it's aimed at a rider who wants a ▶

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softer feel. As I said at the start, many AT owners love their bike.

This is what we do for riders who want more performance and are happy to forgo the soft feel.

Our modifications to the stock cartridge are aimed at giving more damping support, so you lose the floaty feel. Brake dive is significantly reduced and feel is improved. You get more feedback so you know where the front tyre is.

Getting some air becomes fun, not so much an exercise in crashing back to Earth.

I don't change the stock springs for riders under 100kg. It's a lack of preload that causes the sag, not a light spring. For heavier riders we offer linear springs in 0.60kg/mm, 0.70kg/mm and 0.75kg/mm.

What can't the stock cartridge do? It's limited on preload adjustment to

only 10mm. Öhlins has 18mm. The compression adjusters at the base are quite ineffective. The rebound adjusters only have a small usable range, half- to 1.0 turn out. They may have three turns but the adjustment is too coarse.

Upper fork tubes

The internet had a meltdown over AT upper fork tubes wearing the anodising off where the lower fork clamp is. There was lots of talk of overtightening the lower clamp and causing the wear. We measured it, checked every set of AT forks that came in the door and talked to Honda.

First, it's not as widespread as the rumour mill claims.

Second, the wear is above the lower clamp, so it's not tightening torque. The wear happens on the front of the tube so it's the pressure of the bush causing the wear. If you spin the top tube 180 degrees the wear still happens at the front.

Third, the riders who seem to have the most issue are road riders where the fork sits in one place for a long time. Off-road riders don't seem to have near as many issues.

Our answer to this is a performance coating called Kashima coating. It's only available in Japan, and consists of lubricating molybdenum disulfide deposited via electrical induction into the billions of micro-pores on the surface of hard-anodized aluminum to provide better lubrication and less abrasion and wear. This process can take some time to get done due to shipping times in Japan. We have six sets of exchange Kashima-coated fork tubes in stock to allow a fast turnaround because no-one wants to have their bike in pieces for long periods of time.

In order for Kashima coating to be performed the fork tubes must not have any significant scratches or gouges. Kashima is microns thick and it won't fill holes.

Of course another option is to get a complete aftermarket fork such as the Öhlins CRF1000L Africa Twin Adventure fork.

Common rear complaints

The stock 46mm Showa shock is not a bad unit, but it's set up very lightly

Below left: The bar graph for the Africa Twin shock. **Right:** The stock 46mm Showa shock is not a bad unit, but it's set up very lightly for road touring with an emphasis on comfort.

for road touring with an emphasis on comfort. Although the shock spring rate (8.3kg/mm) is okay for an 85kg rider (according to the Australian Bureau of Statics the Average Aussie Male in 2013 weighed 85.9kg. Add on 10kg of riding gear, hydration system and possibly some luggage, plus the fact we aren't all average, there is often a need for a heavier spring), the shock spring preload needs to be increased dramatically to help keep the ride height up.

Result of testing the shock

Generally our first step when we get a shock is to listen to a wide variety of riders, what they think good and bad, then run the shock on the shock dyno and identify the rider feedback in the graphs so we know what we need to concentrate on.

Part of our testing process is benchmarking against aftermarket shocks to see where their R&D took them. Remembering some riders are very happy with the stock shock we can end up with two or three settings that give different damping characters depending on if the riders are mostly road touring with some gravel, mostly adventure touring, or riding it like a CRF450R.

The downside of the stock shock is an ineffective compression adjuster and a spring preload adjuster that's stiff to turn for springs heavier than the 8.3kg/mm stocker. The 9.0kg/mm we often use is okay, but a 9.5kg/mm or 10.0kg/mm



shock spring makes adjustments hard. It's 1.0mm of spring preload for two adjuster turns. The Öhlins unit, by comparison, is three turns of the adjuster per 1.0mm of spring preload, so it's easy to turn with any spring.

We've done some extensive experimenting with stock preload and here's a snippet of our results. To help you interpret the graph here are a few key points to be aware of:

- ☑ If you have the bike up on a lift, the suspension is 'topping out' – completely hanging free. This is called the 'free length' and it's as long as your suspension gets
- ☑ Now if you put the bike back on the ground, the suspension will drop a little due to the weight of the bike. The amount it drops is called static sag
- ☑ And if you then sit on the bike, the suspension will drop some more due to your weight. Even further if you carry a lot of gear. The amount the suspension has dropped from the free length is called the rider sag.

A 'classic' sag setting is 10 per cent

shock travel for static sag and 30 per cent shock travel for rider sag, so here are the numbers for the CRF1000F: a total of 218mm shock travel, so an ideal static sag of 21.8mm and an ideal rider sag of 65.4mm.

As you can see from the graphs, the sag from stock is excessive. With no preload on it, the rear suspension is almost a third of the way through its travel before anyone even sits on the bike. When it's weighted up, with so much less shock travel to absorb any big ruts and thumps, the shock skips around and gets harsh quickly. We have added a spacer/collar to the spring to increase the initial pre-load, and now it's much closer to classic ride-height numbers, leaving more shock absorber travel and a useable preload adjuster.

Simply, use the stock spring for a rider under 80kg with no gear, a 9.0kg/mm spring for most riders up to 120kg, 9.50kg/mm and 10.00kg/mm optional, depending on luggage. The Öhlins comes with a 95N (about 9.5kg/mm) stock. **ADV**

Stock Spring - No Preload	Stock Spring - Full Preload	Taller Spring - No Preload	Taller Spring - Full Preload	Ideal Sag Heights
68mm	48mm	43mm	23mm	21.8mm
98mm	83mm	73mm	58mm	65.4mm
133mm	118mm	108mm	93mm	
218mm total travel	218mm total travel	218mm total travel	218mm total travel	218mm total travel

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