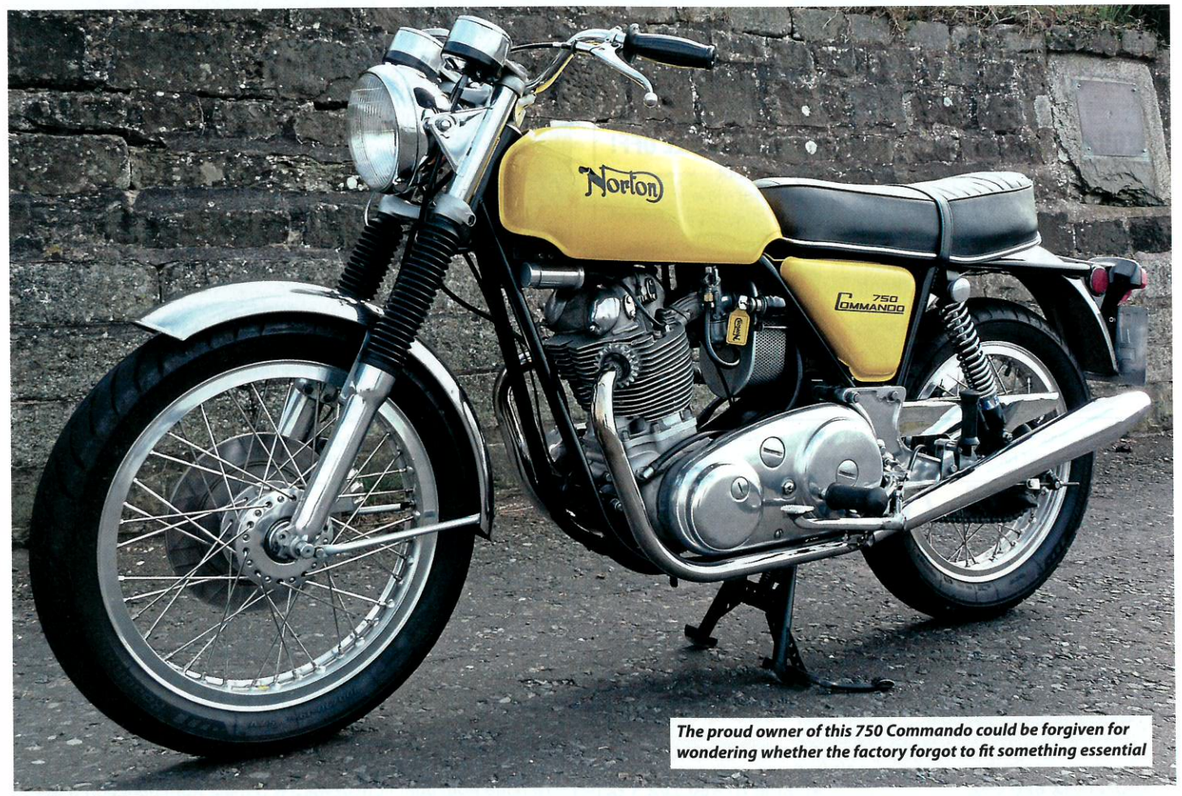
CLASSIC TECHNIQUES

Richard Negus reveals the inside story behind a non-starter

Photos by Richard Negus, Stuart Urquhart and the RC RChive



The proud owner of this 750 Commando could be forgiven for wondering whether the factory forgot to fit something essential

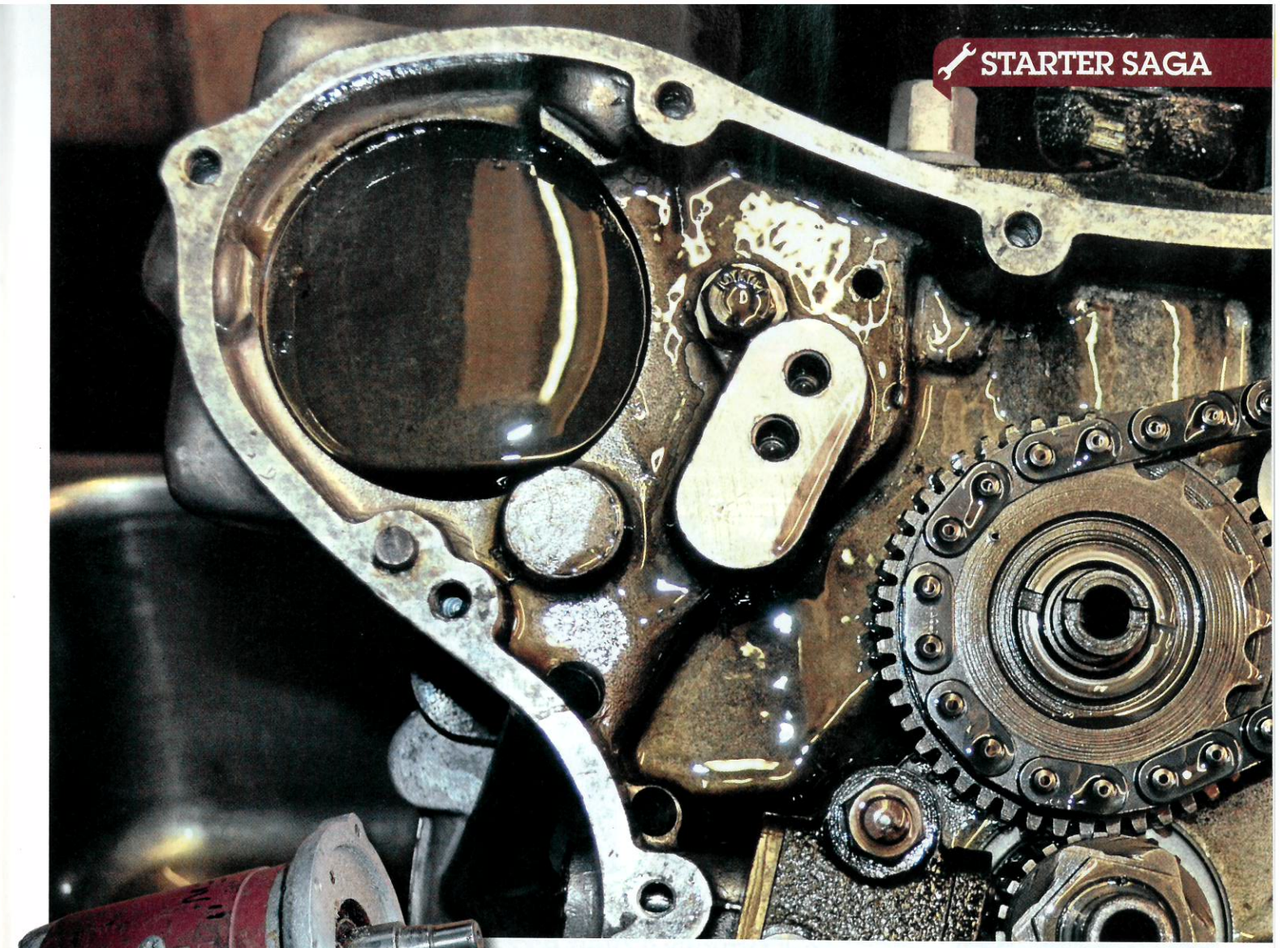
Many owners of early 1970s Norton Commandos must have wondered what the slightly dished steel plate on the back of the timing chest was to be used for. The short answer is that it filled in the redundant hole for a proposed electric start system that filled a gap where the magneto used to be on older engines, looked neat, but didn't actually work. But, production lead times being what they were then, the crankcase castings had to be modified to accept the starter mechanism long before the system was fully developed and approved.

So yes, it is true that the Commando was heading for an electric hoof even in its early 750 days, and yes, the factory tooled up to make it, and no, it didn't work. Hence the interesting steel plate

One of the first jobs I was allocated when changing allegiance from BSA to Norton employment in 1969 was to pick up an electric start scheme for the Commando. This was initiated at the AMC Plumstead design office and transferred to the Andover office with Bob Trigg, chief designer, and Roger Jordan, chief draughtsman, in charge. My part was to produce the individual manufacturing drawings to have prototype parts made and to carry it forward to production.

The motor, a Lucas M3 type, drove into a hypocycloidal (Google® is your friend) reduction gearbox, thence via a sprocket and chain to the intermediate timing gear and then to the crankshaft. Like the camchain, the starter chain tension was to be adjusted by means of a moveable slipper mounted on a cast boss inside the timing chest.

Calculations had already shown that the overall reduction ratio between Lucas starter motor and the crankshaft needed to be of the order of 35:1. As the ratio between the intermediate timing gear and the crankshaft was fixed at 1:2, this meant that the starter reduction gearbox required a 70:1 ratio. And that's where the problems started…



Above: Drive was to be taken from the reduction gearbox by a short chain. The boss with the two drillings was to accept that chain's tensioner

Left: Recently offered for sale online, the Commando electric starter that never was…

When the electric foot finally appeared, a little late in the day, the Prestolite motor which was chosen instead of the Lucas M3 drove through a gear train inside the primary chaincase. It was never exactly excellent. Here's a more modern replacement electric start fitted to a Mk3 Commando – built by Norvil

The first prototype installation certainly turned the engine over, but only just, using a car-sized battery to provide the electrical oomph. But worse, when the engine kicked back, the starter drive chain snapped or, if you were *really* unlucky, the crankshaft timing gear teeth broke off!

Analysis of the system confirmed that:

- the motorcycle battery, cables and starter motor didn't provide enough torque to turn the engine quickly enough
- the hypocycloidal gearbox absorbed a large proportion of the motor's power
- the gearbox was incapable of being driven backwards when the engine kicked back

To reduce the effects of kick-back, a torque limiting clutch was included into the timing intermediate gear. This worked, mostly, reducing but not eliminating the incidence of broken chains. To reduce the torque required to turn the engine, a decompressor operating on one of the exhaust rockers was tested.

After months of development, the inevitable conclusion was reached and further development halted. So several thousand 750 Commando crankcases have some redundant machining features and a plate specially made to cover up those holes. Not only that, the Lucas subsidiary in India, TVS, had already been given the go-ahead to make Norton starter motors specifically for the reduction gearbox – and they also were redundant.

But not quite! Recently there were two of those starter motors offered for sale on a well-known auction site. One seller perpetuates the myth that the motor is a genuine spare part for an electric start Commando and, accordingly, asks £79.99. The other is truthful about its provenance and asks a more realistic £29.99. If you have a Triumph T160 or a Norton rotary, both of which use the Lucas M3 starter motor, these are a good source of new field coils, brushes, brush plates and end caps. With a bit of ingenuity, it is even possible to use the armature too… RC