

## Replacing Commando Inlet Valve Seals without Removing the Head

Last year, I bought a second hand Fair Spares Commando and after about 100 miles was disappointed to find that the left hand cylinder was smoking. The bike had been laid up for four years before I bought it, so there was a fair chance that the inlet valve seal had dried up and come away. I really did not want to remove the head as the bike is so well put together I hated the idea of taking it apart just for one seal. Fortunately, whilst browsing [accessnorton.com](http://accessnorton.com) I came across an article on valve seal replacement without head removal, written by a guy called Ludwig from Flanders. I followed his instructions with complete success and after a year of NOC membership was surprised to find that this technique is little known here in UK. Ludwig has kindly consented for me to reproduce his article here, along with some notes on my own experience of doing the job.

Ludwig first of all acknowledges that he has invented nothing new here; apparently this is done on cars all the time using compressed air and a special valve retainer removal tool. This tool can't be used on a Norton, because of the lack of space over the valve and besides, the hissing sound of compressed air escaping is likely to drive you crazy!

An alternative is to use the rope trick, but I just wasn't convinced that stuffing rope down a plug hole was a good idea and that using Ludwig's easy to make special tools is a much better way to go. By the way, I have only the most basic workshop tools and made them quite easily.

### **Making the tools**

Tool 1 : valve spring compressor

Tool 2 : valve stop

Bend a strip of metal, or cut from any U-shaped profile, roughly these dimensions in mm :



Don't make it shorter, or you'll have trouble compressing the valve spring enough. It must be quite strong for stability, but the thinner it is, the more space you'll have for fiddling with the collar retainers.

The central bolt is about 5 cm long.

Because threaded rod with the correct thread seems impossible to find, Ludwig made it out of two parts, using M5 rod and an old valve adjuster. I chose to buy a 60mm long, M7 set screw and found this was a very good fit.



The finished compressor will look something like this:



The lower nut is important to prevent the bolt from turning while compressing.

Ludwig suggests that the valve stop, Tool 2, is also fabricated from two parts: a drilled out spark plug and a bolt with a lip. If you find an old plug with a 16 mm hex, it will be more compact:



Knock out the ceramic and centre electrode (wear eye protection!) and drill out. I found it really hard to remove the ceramic centre and so used a TDC finding tool, enlarging the central hole to accept the bolt.

For the bolt, Ludwig used a bolt that is used on Mustangs to hold the front brake on the spindle. Anyone familiar with old Fords should recognise this bolt immediately. It is the perfect size, but of course any bolt with a large head will do. I used a large coach bolt.



The chamfer is very important, as it enables the piece to easily slip through the plug hole:



It needs to be a minimum of 6 cm ( 2.5" ) long and the lip must stick out about 8-9 mm (3/8")  
Cut a slot in the top of the bolt in line with the lip. Chamfer one end and mark the orientation of the lip with a dab of paint. The bolt must be a nice sliding fit in the plug.

The finished tools:



You will also need a 12mm temporary replacement rocker shaft and a thinner rod of about 4mm to use as a centring tool.

For the temporary rocker shaft, I used a M12 hex bolt 120mm long, with the threaded portion cut off. All the M7 and M12 bits were sourced from [www.a2stainless.co.uk](http://www.a2stainless.co.uk).

### **Replacing the seal**

First step is to remove the rocker spindle(s).

If you don't want to pull it cold, take a short ride first to warm the head. Remove the tank, the spark plugs and the valve cover. Turn the engine over so that the left hand inlet valve is down (to pull the right hand shaft) and the piston is a few mm past TDC. Pull the rocker shaft and replace it with the 12mm dummy shaft. If you are replacing both valve seals, turn the engine 360° and remove the left hand shaft, replacing it with another 12mm dummy shaft.

With a cold engine, slide the loosely assembled Tool 2 into the plug hole. Turn the hollow plug in a few turns and then turn the lip towards the valve stem and finger tighten the lock nut.



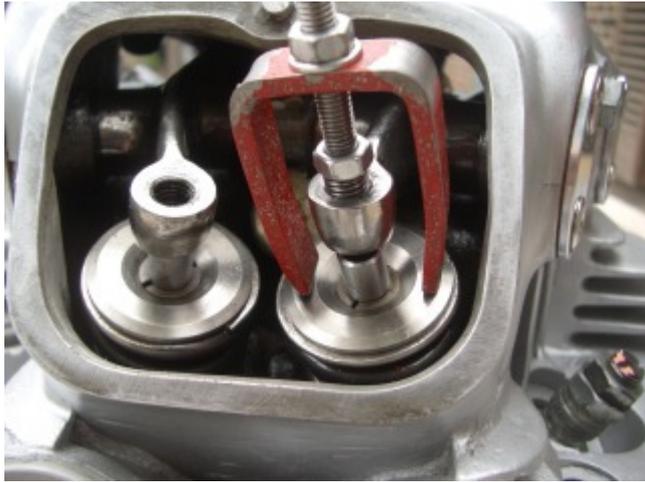
From the inside, it will look like this :



Remove the valve cover stud, using two nuts:



Now remove the valve adjuster and install Tool 1. If you have mushroom adjusters, use a thin rod in place of the rocker shaft so that you can lift the rocker up sufficiently to remove the adjuster bolt.



Compress the valve spring. If the retainers stick a little, a tap on the spring collar will break them loose. Continue compressing until you can remove the two retainers. A magnetic screwdriver or a pair of fine tweezers is handy for picking out the retainers.



Remove Tool 1 (the threaded rod can be left in place). Next, if you don't mind fiddling with spring washers and shims in tight places; just remove the rocker arm completely. But if you prefer to keep the rocker arm in the head, go to the next step: Loosen Tool 2 and turn it 180 ° so that you can lower the valve against the piston (it was a few mm past TDC, remember?):



Replace the temporary 12mm rocker shaft with a 4mm thin rod. This will allow you to push

the rocker out of the way just enough to remove the springs:



Once the spring is out, keep the rocker up with for example, a rubber band. You now have free access to the seal!



Once the seal is replaced, you just reverse the process to re-assemble:

Re-install the spring.

Pull the valve back up.

Turn Tool 2 back 180° to hold the valve closed and tighten.

Note: If the valve has dropped too deep to catch it with pliers, remove Tool 2 and pull it back up with a wire hook through the plug hole.

Re-install valve collar, Tool 1, compress, install retainers, etc.

Here you can see why it is handy to use a temporary 12 mm rocker shaft:



The spring collar will push up against the rocker arm, so you'll have to press it down a little, whilst centring the rocker and shims with the centring tool and then fit the loose fitting 12 mm shaft. Installing the proper rocker spindle at this stage would be difficult. Fitting the proper rocker spindle is best done after the collar retainers are in place and Tool 1 is removed. Don't forget the correct orientation: oil hole towards the valve. Adjust the valve clearance, remove Tool 2, turn engine 360° and do the other one.

With this procedure you can easily do both seals in two hours.