



## Fitting notes for BSA Gold Star valve spring conversion



The conversion uses premium quality valve springs made from the best materials and alloy valve spring retainers made from aerospace certificated bar stock.



The valve springs are made from today's very best materials: super clean Silicon Chromium Vanadium Nickel alloy steel, which is especially intended for the manufacture of valve springs and other springs requiring high fatigue properties and good relaxation properties. The springs are made in the UK to the original BSA specification for the BSA 500cc DBD and 350 cc DB motors (BSA part nos. 65-2495 inner and 65-2494 outer).

The spring retainers are fully interchangeable with those available from Eddie Dow in the 1960s and are made in the UK from aerospace certificated light alloy bar stock on CNC equipment. They fit all BSA alloy head A10 models but will not fit A7, A10 or A7SS as they use different collets. They are less than half the weight of the original BSA steel retainers.

The conversion uses the stock BSA collets and valve spring seating washers.

- Note that all valve springs are highly stressed and care has to be taken with them. The outer parts of the coils of valve springs are their most highly stressed area. Special care must be taken not to scratch valve springs, which can happen during fitting. Also, rust on springs makes them much more prone to early failure, so rusty valve springs should not be used.
- The outer springs we supply are nominally 1.67" to 1.70" (42.4mm to 43.2mm) free length when new. The inners are nominally 1.50 to 1.56" (38.1mm to 39.6mm) free length when new.
- The outer springs are variable pitch and must be fitted with the close coils adjacent to the cylinder head.
- The installed length of the outer springs should be between 1.28" and 1.33" (32.5mm and 33.8mm). If the installed length is out of this range then either the

steel seating washer can be thinned or shims can be used to raise it. However, most commonly the installed length is within this range.

- The installed length of the inner springs is dictated by the fit of the outer springs.
- Fit the original BSA twin spring seating washer (part 67-0886) reversed, i.e. the larger diameter raised section to the head.
- Before final assembly, check that each retainer and its collets lock up when fitted to its valve and pulled by hand and that each valve seats squarely on its seat.
- After assembly, give the end of the valve a light tap with a soft face hammer and then inspect the collets for good seating.
- When fitting, lubricate all components with engine oil
- At this stage it is good practice to fit the cylinder head to the engine, with pushrods fitted and adjusted valve clearances, and turn the engine over to check running clearances of all components. Valves can be pressed in whenever it is needed to confirm their freedom to move. It should be verified that:
  - Each valve spring, when fitted, will have an installed length that is in range.
  - Springs are not too close to being coil bound at full valve lift (usually only an issue if exotic camshafts are being used). Do this by noting down the installed spring length for each valve at full lift, and comparing this with the coil bound length for its spring when it is gently compressed to coil bound in a vice.
  - Neither the valve collets nor the spring retainer come too close to the top of the valve guide at full valve lift (usually only an issue with exotic cams or when valve stem oil seals are fitted).
  - Valves don't come too close to the piston.
  - When valves are both open, they don't come too close to each other.

With these checks made successfully the conversion is properly installed.

- The above checking is greatly simplified if special weak *assembly checking springs* are used, after which the head is built up with the proper valve springs. If full strength valve springs are used, the task is daunting with the temptation not to do the checks thoroughly.
- We can supply assembly checking springs, with usage notes available [here](#). Because these springs are weak, they make it very easy to rotate the engine and depress valves by hand to test clearances as they exert just a few pounds of force. They can also be moved aside a little to simplify measuring the installed length figures.
- Because the valve springs used in this conversion are more compact, rocker boxes off A7/A10 and A7SS will fit the converted A10 alloy head motors.