'B' Series and car engine differences

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The B series of engines have little in common with the post war motorcar engines except for the bore and stroke dimensions. It is not surprising that these dimensions are the same since the same block and head transfer machines could be used. However very few of the parts will interchange between the B series and car engine, not only are the external dress accessories different but the major units also. The cylinder head, block and crankshaft are different and not interchangeable. Pistons, liners, con rods and some valve gear parts are interchangeable with some care.

The B Series engines were designed towards the end of WW II and although some WW II trucks were fitted experimentally with the units, major production of the receiving vehicles did not occur until around 1950.

It was announced at the press launch of the B Series engines in 1948 that they would NOT be used in motor cars. Rolls-Royce did not refer to B series engines in the context of motor cars.

B series were produced as:-

B40 4 cylinder 2838, cc about 19000 units produced, some 15000 of these by Austin Motor Company.

B60/B61/B61SV 6 cylinder 4256cc/4887cc, at least 14000 units being B60 types. Production may have exceeded 20000 for both types.

B80/B81/B81SV 8 cylinder 5675cc/6516cc at least 8500 units produced. It was normal for B80/B81 types to be fitted with twin plate clutches.

Engine code "0" indicates 3.50 inch bore e.g B60,B80
Engine code "1" indicates 3.75 inch bore e.g B61,B81
N.B There was no B series engines, except experimental, equivalent to the 3.625 inch bore of the later Bentley MK VI and R type cars or their opposite number R-R chassis.

Major construction differences were indicated by Mark numbers from Mk1 to Mk8, simplified below:-

Mk1 Prototype engine using car crankcases.

Mk2 Alloy cylinder head, cast iron block, wet sump.

Mk3 As Mk2 but dry sump.

Mk4 Alloy cylinder head, cast alloy block, wet sump, experimental only.

Mk5 U.N.F screw threads, cast iron head and block, some parts not fettled and simplified. Wet sump.

Mk6 as Mk5 but dry sump.

Mk7 Generally as Mk5 but high compression 7.25:1, wet sump in B81 guise only

Mk8 As Mk7 but dry sump.

Most common were MK5 and Mk6 units. All U.N.F engines had their valve covers stamped or cast with the letters U.N.F in the place where the car engines bear the words "Bentley" or "Rolls Royce".

Many experimental engines were tried including the use of short strokes, supercharging, diesel versions, triple S.U installations, direct running in the alloy block without liners, special B40 version to B41.Most on a one off basis.

Normal engine dress included waterproof ignition for wading on military units, along with high output dynamo and starter units. Mechanical fuel pumps were also fitted.

Applications initially included B Category Type British forces vehicles not directly involved in fighting and some C Category types which were cranes or plant usually with a B type chassis underneath. Later other categories were added.
Vehicles being produced by Austin, Leyland, Thornycroft, Douglas, Alvis, Humber to name a few.

Civilian versions included B61/B61SV and B81SV that were not used for military purposes. Civil applications included many fire engines by Dennis Bros, and even retro fitting a rear engine double deck bus with a B81G, (G= Gas powered) engine.

A few enthusiasts have fitted B series engines into cars especially Phantom III's, but the B series is not just a drop in conversion for any Crewe made post war six cylinder car. The engines were not as refined or finished as the car engine and the external accessories differ. Enthusiasts also need to bear in mind that these ranges of engines were designed for commercial and military applications.

ASSuming will catch you out. For example these engines all have sump (oil pan) adaptors and car sumps will not interchange. The adaptors are fitted between the block and sump pan. All except the B40 have external Harmonic type balancers on the end of the crankshaft, not slipper drive dampers fitted internally within the timing gear cover as on the car engines. The crankshaft gear is machined as part of the shaft, unlike the car where the gear is separate. The shaft assemblies are longer which should send out warning signals to those contemplating a "weekend" swap over.

The B series engines can normally be identified from the car engine by the fact that they have sump adaptors and the thermostat housing is positioned on the side of the cylinder head. That is on the opposite side to no 1 plug.

Perhaps surprisingly, a B series engine in some guises can be difficult to identify as a R-R engine even by those that know the R-R six cylinder, such is the engine dress of components.

The above information is not intended to be exhaustive, but would I hope provide enough information to suggest that the B series is NOT a car engine. With the exception of the bore and stroke, only a few of the components interchange, and even then except for pistons and rods no major parts will swap. Note here that "interchanging" in this context does NOT mean that the parts are identical, merely that they will interchange. To my knowledge ALMOST NONE of the parts are identical. These engines were without doubt an extension of the post war R-R rationalised range. They were however no different than similar engines produced in Europe by Austin, Morris, Ford or GM in that they encompassed the same bore and stroke as their motor car counter parts, albeit designed for commercial or military purposes.

It is interesting to note that “B” series engines were produced in the large bore version much earlier than those eventually fitted to the S series cars.