Tri-Carb Setup & Camshafts

This article is intended to give some help to those like myself who are interested in tuning the AH 3000 engine for road use. The information is based on my own research and findings, and neither myself nor the Austin Healey Club UK can take any responsibility for the accuracy of the information, or any consequences of it's use.

The 3000 engine effectively appeared in four different guises relating to camshaft and carburettor specifications:

AH3000 Model Standard Engine Setup

Model	3000 MkI 124bhp	3000 MkII 133bhp	3000 MkIIa (BJ7) 132bhp	3000 MkIII (BJ8) 148bhp
Camshaft	230° duration	230° duration	240° duration	252° duration
Carb setup	2 x 1.75″ HD6 (0.100″ jet)	3 x 1.5″ HS4 (0.090″ jet)	2 x 1.75″ HS6	2 x 2.0″ HD8
Needles	Std-CV; Weak-SQ; Rich-RD	Std-DJ; Weak-DH; Rich-DK	Std-BC; Weak-TZ; Rich-RD	Std-UH; Weak-UL; Rich-UN
Dashpot spring	AUC 1170, Type A-Green, 12oz	AUC 4387, Type A-Red, 4.5oz	AUC 1170, Type A-Green, 12oz	AUC 4826, Type A-Red/Green,

Modified Engine: 3x HD6 (1.75″) Carbs

The use of three HD8 2″ carbs is well documented, all three having the same needles (UH) and dashpot springs as the standard setup. However, I have not been able to locate any data for triple 1.75″ carbs. In my case, the attraction of this setup was that I already had the two standard HD6 carbs and a set of standard MKII inlet manifolds. These manifolds can be opened out from 1.5 to 1.75″ diameter but no further. Fitting triple 2″ HD8s requires larger, after-market, manifolds.

The following charts my experiments with different carburettor settings, first on an engine fitted with a BJ8 profile cam, then on my second engine with a Denis Welch DWR8 cam; details of which are given below. Both engines have a branch exhaust manifold fitted whilst the second engine also has an aluminium head and Omega forged pistons.

In conclusion, I found the BC needle to be best with the BJ8 camshaft, and the SQ needle best with the DWR8 camshaft.

The following chart below gives a comparison of the annulus area for each needle, i.e. the area between the needle and the jet, at each stage of the needle travel. The measurements are equalised at position 2 which is about the idle position. For needle data go to this Triumph site by Teglerizer Engineering

Austin Healey 3000 Camshafts:

Make	Ref	Lift		Duration	Inlet		Exhaust	
		mm	ins		btdc	abdc	bbdc	atdc
AH MkI		8.054	0.3145	230	5	45	40	10
AH MkII		9.35	0.368	230	5	45	51	21
AH MkIIa		9.35	0.368	240	10	50	45	15
AH MkIII	AEC865	9.35	0.368	252	16	56	51	21
Piper	BP270	10.16	0.400	272	29	63	64	28
Kent	AH2	10.44	0.411	278				
Denis Welch	ENG656/7	9.35	0.368	268				
Denis Welch[1]	DWR8	10.9	0.430	278	33	65	63	31
SC Parts[2]	SC6614	11.48	0.452	300	50	70	75	45

1. requires pocketed block & 0.15″ valve clearance
2. Requires Webers (note as MGB Race AEH770)1

3x HD6 Carbs with BJ8 camshaft (252 deg.)

Needles	Dashpot spring	Comments
CV (MkI std)	AUC 4387, Type A-Red, 4.5oz	Rich low/mid range causing plugs to foul
SQ (MkI weak)	AUC 4387, Type A-Red, 4.5oz	OK but a bit flat in the mid range
BC (MkII std)	AUC 4387, Type A-Red, 4.5oz	OK
TZ (MkII weak)	AUC 4387, Type A-Red, 4.5oz	Very flat low/mid range

3 x HD6 Carbs and a Denis Welch DWR8 camshaft (278 deg.) (see camshaft data below)

Needles	Dashpot spring	Comments
BC (MkII std)	AUC 4387, Type A-Red, 4.5oz	A bit rich, lumpy low range, blackish exhaust
BC (MkII wtd)	AUC 1167, Type A-Yellow, 8oz*	Good, most satisfactory combination
SQ (MkI weak)	AUC 4387, Type A-Red, 4.5oz	Good, a bit lumpy low/mid range on part throttle
SQ (MkI weak)	AUC 1167, Type A-Yellow, 8oz*	Good
TZ (MkII weak)	AUC 1167, Type A-Yellow, 8oz	OK, smoother low/mid range, low power
RK	AUC 1167, Type A-Yellow, 8oz	Feels a bit rich, sluggish
TL	AUC 1167, Type A-Yellow, 8oz	OK some slight misfire at low speed part throttle. Poor when cold.

* Using a straightened paper clip through the breather hole in the top of the dashpot top and a bit of masking tape to stop it sliding under it's own weight, a full throttle blast indicated that the piston was reaching it's full travel with this spring.