Distributor Curves

Last updated 03-May-2019

Thanks to John in Australia for supplying the data for the 41692, 41693 and 41695 distributors, the 41600 and 45DE4's, and the 40943 Special Tuning. The 41427, 41643, and 45DE and 45DM specs are from Doug Jackson's 'British Automotive' site and the 41264 from TDC Engineering. Info on the 41599 came from Doug Keene, extracted from the 2002 edition of the Bentley Manual for 1975-1980 cars. If you have any additional information for the 45DM4 or any other MGB distributors please mail me.

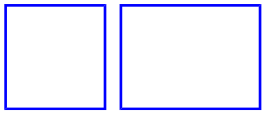
Note 1: All degrees are given in **crankshaft** degrees i.e. as measured at the crankshaft with a timing light. However the figures stamped on the vacuum capsule will be in distributor degrees i.e. half the crankshaft figure. For example the capsule for the 25D4 41288 should be stamped '5-13-10' which indicates 10 distributor degrees max i.e. 20 crankshaft degrees as shown in the table (the '5' represents the depression in inches of mercury as which vacuum advance starts and the '13' the depression at which it reaches its max). In the table below vacuum advance is given in the form 'Starts 5, Ends 13, Max 20 degrees' which means there is no vacuum advance below 5 in Hg., a progressive advance from zero degrees with increasing vacuum, until at 13 in Hg. there is a maximum of 20 degrees as measured at the crankshaft pulley. There is no change in advance with further increases in vacuum.

Note 2: Inside the distributor under the points plate you will find the springs and weights. There is a finger on the upper part of the distributor shaft which moves towards one of the spring posts as centrifugal advance increases. Eventually it hits it and prevents any further centrifugal advance, this is the stop-plate. The amount of centrifugal advance it allows is usually stamped near the end of the finger, and again this is in distributor degrees which must be doubled to get crankshaft degrees.

Note 3: Some degrees and rpm figures in the official publications are given as ranges, I have used the mid-point in these ranges for clarity.

Note 4: In theory the centrifugal figures show only the *additional* advance at the given rpm, whereas the strobe figure is the *sum of the static and the centrifugal advance* at the given rpm, and this can be seen to be true with some distributors e.g. the 40897 and 40916 for the 18G, GA, GB etc engines (4 degrees centrifugal @ 600 rpm plus 10 degrees static = 14 degrees strobe @ 600). However the 41693 seems to include the static figure in the centrifugal curve i.e. extrapolating the curve we get 10 degrees @ 1500 rpm which is the same as the strobe figure whereas it should be 7 degrees less. Then again, there is an 'advance check' figure quoted for this distributor of 19 degrees @ 2000 rpm, which is mid-way between the two, as are some of the other distributors

in the list! All I can say is that I have used the figures given in my Haynes and Leyland Workshop Manuals as given, warts'n'all.



Centrifugal advance is obtained by turning the upper part of the distributor shaft, carrying the points cam, **anti-clockwise** relative to the position of the crankshaft to open the points sooner and hence advance the timing. The lower part of the shaft has a pair weights restrained by springs. The faster the shaft spins the more the weights will try to fly out, up to a maximum controlled by a stop-plate. The springs give a varying amount of advance through the rpm range depending on their strength and other factors. One of those factors usually relies on there being two different springs - a weak and a strong, the weak being 'tight' on its mounting posts and the strong being loose i.e. having free play. This means that as the distributor spins up from a standstill only the weak springs is restraining the weights, so they move out a relatively large amount, advancing the timing a relatively large amount, for each step increase in rpm. This movement eventually takes up the free play in the strong spring, and then the strong spring is also restraining the weights. So the same step increase in rpm moves the weights out and advances the timing a relatively smaller amount than before. This gives the curve its characteristic 'knee' which can be seen - in varying positions on the rpm range and to varying degrees - in most if not all MGB distributors.

Vacuum advance is obtained by twisting the points plate **clockwise** relative to the crankshaft and hence distributor cam position (which is rotating anti-clockwise), to open the points sooner and hence advance the timing. Because centrifugal advance moves the cam position, and vacuum advance moves the points position, it can be seen that both advance mechanisms work completely independently, and total advance will be the sum of static advance plus centrifugal advance plus vacuum advance. Vacuum from the inlet manifold, which changes with throttle opening generally being high with small throttle openings and low with large, is applied to a diaphragm in the vacuum capsule and pulls it against spring pressure towards a stop. The spring strength controls how much the diaphragm moves with a given vacuum - a weak spring giving a large movement and hence more advance, and a strong spring giving a small movement and less advance. How much the spring is compressed at rest controls the minimum vacuum that will still move the diaphragm - very little compression allowing it to still give some advance with low levels of vacuum, and a large amount of compression meaning that vacuum advance is removed while there is still significant vacuum present. The distance the stop allows the diaphragm to move from rest controls the maximum advance that can be given - the greater the distance the greater the maximum possible advance.

Finally it should be remembered that these specifications were arrived at on new engines, to manufacturers specifications, and using the fuels available at the time. 30 years on there are the effects of wear and replacements with non-standard components, and most importantly lower octane unleaded fuels. Even when new the figures took into account a range of component tolerances plus a safety factor, and some new engines could be run with more advance than the book figures, giving noticeably better performance and economy. Without spending a lot of time and money on a rolling road

the best you can do is advance it until it just starts pinking, then back it off a bit.

Pinking/pinging: *Added September 2008* Note that whilst in my experience pinking is very audible on high compression engines, it may be less so on low compression, as some people describe being able to advance the timing until the first combustions stall the starter, but still can't hear any pinking when the engine is running. Some also state that the pinking you can't hear is more damaging than the pinking you can. On the one hand I'm doubtful about that, but on the other hand where low compression engines are concerned it's possible that pinking **is** inaudible, and because of that people may be driving in that state for long distances, and the slight stress of each pinking event is incrementing to do damage. With high compression in my experience pinking is very noticeable, which causes me (at least) to do something about it, so even though the stress of each event is much higher than for low compression, because I back-off or whatever (even accelerating seems to stop it, maybe because of the bigger charge cooling the combustion chambers), the total damage is less. I've been driving my roadster for 20 years and 50k miles with intermittent pinking, especially in hilly country, with no apparent damage as yet. But when I had the heads off the V8 (low compression) I was surprised to see several little craters in various pistons, so maybe non-audible pinking is more likely in low-compression and hence potentially more damaging. But as I've not had the head off the roadster it isn't a fair comparison.

The distributor for the factory V8 can be found here.

For Gold Seal equivalent engines click here.

Market and year: *(from the start of the 1977 model year all LHD cars were roadster and made to North American spec)*

All markets 62-67 Not USA 67-68 Not USA or Canada 68-71	USA & Canada 67-70 California 69-70	1963 - 1970 (alternative)	USA & Canada 69-70	USA & Canada 71	Home market Aug71-Nov73
Non-North American export Aug71-72	European emission control requirement ECE15 1972-on	North America 71-72	USA & Canada 72-74	Not North America 73-74 (chrome bumper)	Not North America 74-80 (rubber bumper)
USA 74-75 Canada 74-76 (rubber bumper)	California 75 (a)	California 75 (b) USA 76	USA 75-76	USA except California 76-80	Californian 76-79 Japan 80
Canada 76-80	USA 77-79(a)	USA 77-79(b)	USA 80	California 80	

Engine number: *(from the start of the 1977 model year all LHD cars were roadster and made for North America)*

18G GA GB GD GG	18 GF GH 18 GJ	18 G - GH (alternative)	18 GH	18 GK	18V 581/582 18V 583 (automatic) Home market
18V 581/582 18V 583 (automatic) Non-North American export	18V 581/582 18V 583 (automatic) to European emission control requirement ECE15	18V 584/585	18V 672/673	18V 779/780	18V 846/847
18V 836/837 18V 797/798	18V 797/798	18V 797/798 California 75	18V 801/802	18V 883/884 USA except	18V 890/891

USA 74-75 Canada 74-76	California 75	18V 801/802 USA 76	USA 75-76	California 76-80	Californian 76-79 Japan 80
18V 892/893	18V 883/884 18V 890/891 USA 77-79(a)	18V 883/884 18V 890/891 USA 77-79(b)	18V 883/884 18V 890/891 USA 80	18V 883/884 18V 890/891 California 80	

Distributor number:

25D4 40897 (a)	25D4 40897(b)	25D4 40916	25D4 40943	25D4 41032	25D4 41155	25D4 41234	25D4 41264	25D4 41288
25D4 41290	25D4 41339	25D4 41370	25D4 41391	45D4 41427	25D4 41491	45D4 41599	45DE4 41600	45D4 41610
43/45DE4 41643	45D4 41692	45DE4 41693	45DE4 41695	45DM4 41813	45DE4 41814	43/45DM4 41815	45DM4 41851	45DM4 41853
Special Tuning stage 3/4	Aldon 101BR2			Factory V8				

Click on the charts for the big picture

18G GA GB GD GG All markets 62-67 Not USA 67-68 Not USA or Canada 68-71	25D4 40897 (HC)			25D4 40916 (LC)		
	Degrees	RPM	Chart	Degrees	RPM	Chart
Dwell	60+-3			60+-3		
Static	10			8		
Strobe	14	600		12	600	
Centrifugal	4	600		6	600	
	6	700		8	800	
	9	900		9	1000	
	15	1600		18	3000	
	20	2200		24	4400	
Vacuum - carb	Starts 5	Ends 13	Max 20 degrees	Starts 4	Ends 12	Max 16 degrees

18 GF GH USA & Canada 67-70 18 GJ California 69-70	25D4 40897/41155 (HC)		
	Degrees	RPM	Chart
Dwell	60+-3		
Static	10		
Strobe	20	1000	
Centrifugal	10	500	
	24	1625	
	30	3000	
Vacuum - carb	Starts 5	Ends 13	Max 20 degrees

Note: An oddity, this. The Leyland Workshop Manual specifies '40897/41155' exactly like that, leading one to think that both distributors have the same characteristics. However the curve and strobe data differs significantly from that of the earlier engine where only the 40897 is specified. Mistake? Curve data is for the 41155 but either curve is suitable for the engine? Who knows?

18 G - GH 1963 - 1970	45D4 41427 (HC)		
	Degrees	RPM	Chart
Dwell	51+-5		
Static	not given		
Strobe	13	1500	
Centrifugal - max	18	4000	n/a
Vacuum - carb	Starts 5	Ends 13	Max 20 degrees

Note: This 45D4 41427 must be treated with a degree of scepticism as its characteristics are **very** different from the factory specifications for the 18G to 18GH engines, as indeed the original distributors for those engines are from each other.

Update August 2005: The curve (actually just the max figure) and strobe information above came from two sites - TDC Engineering and Doug Jackson. These sites agree with each other even though one specifies distributor degrees and the other crankshaft degrees. Neither gives a source, and indeed one could have derived it from the other, the primary being incorrect and the secondary simply repeating the error. The 41427 (with or without an 'E', it isn't clear) probably **is** an original Lucas 45D4 distributor, I'd like to see original specifications for it. It could well be the recommended 45D4 replacement for defunct 40897s after 25D4 distributors ceased production in the mid-70s. Moss US claim to currently supply it with the same curve as the 25D4 40897, i.e. as a direct replacement, and Ray Wyberski has come across what seems to be an NOS example which has the same measured curve as the 40897. This isn't a 'Eurospec' distributor as it was not used as standard equipment in Europe any more than it was in North America. Use on anything other than an original 18G to GH engine may well require some trial and error to find a level of advance that does not give pinking at some point in the range, just like any distributor today really, given the very different fuels from originally. Moss also admits that for some time what they sold as a 41427 did **not** have the curve of the 40897, until they told the supplier what curve they were expecting. My experience of rebuilt and remanufactured distributors has been very poor, until you test what you have received you have no guarantee that it is what you have been led to believe. Caveat Emptor.

It should be noted that the dwell information given above **is** correct for the 45D4 (indeed any 45D4) even when used on an engine that originally had a 25D4 (any 25D4), as the specified dwell is a function of the basic distributor design and not any requirement of the original engine. The apparent reduction in dwell from 60 degrees to 51 degrees is totally insignificant on a standard MGB engine given that 8-cylinder engines have a dwell half that of a 4-cylinder and 12-cylinders 1/3rd that of a 4-cylinder! It's also why dual point distributors on a standard MGB engine are just twice the trouble for no benefit.

18 GH USA & Canada 69-70	25D4 41264 (HC)		
	Degrees	RPM	Chart
Dwell	60+-3		
Static	not given		

Strobe	20	1000	
Centrifugal	0	700	
	3	1000	
	20	2300	
	30	5200	
Vacuum - carb	Starts 5	Ends 11	Max 16 degrees

18 GK USA & Canada 71	25D4 41339 (HC)		
	Degrees	RPM	Chart
Dwell	60+-3		
Static	10		
Strobe	15	1500	
Centrifugal	10	1000	
	24	2800	
	30	4600	
Vacuum - manifold	Starts 7	Ends 13	Max 10 degrees

18V 581/582F, 18V 583F (automatic) pre-ECE 15, Home market Aug71-Nov73, HS carbs	25D4 41288 (HC)			25D4 41290 (LC)		
	Degrees	RPM	Chart	Degrees	RPM	Chart
Dwell	60+-3			60+-3		
Static	10			10		
Strobe	13	600		13	600	
Centrifugal	3	600		3	600	
	6.5	700		8	800	
	9	900		9	1000	
	15	1600		18	3000	
	20	2200		24	4400	
Vacuum - carb	Starts 5	Ends 13	Max 20 degrees	Starts 4	Ends 12	Max 16 degrees

18V 581/582V, 18V 583V (automatic) pre-ECE15, Non-North America export Aug71-1972, HIF carbs	25D4 41288 (HC)			25D4 41290 (LC)		
	Degrees	RPM	Chart	Degrees	RPM	Chart
Dwell	60+-3			60+-3		
Static	10			10		
Strobe	13	600		13	600	
Centrifugal	3	600		3	600	
	6.5	700		8	800	
	9	900		9	1000	
	15	1600		18	3000	

	20	2200		24	4400	
Vacuum - carb	Starts 5	Ends 13	Max 20 degrees	Starts 4	Ends 12	Max 16 degrees

18V 581/582V, 18V 583V (automatic) to ECE15, Non-North American export, 1972/73, HIF carbs	25D4 41032 (HC)		
	Degrees	RPM	Chart
Dwell	60+-3		
Static	5		
Strobe	15	1000	
Centrifugal	1.5	600	
	2	700	
	4.5	900	
	12	1600	
	19	2200	
Vacuum - carb	Starts 3	Ends 8	Max 14 degrees

18V 584/585 North America 71-72	25D4 41370 (LC)		
	Degrees	RPM	Chart
Dwell	60+-3		
Static	10		
Strobe	16	1500	
Centrifugal	20	1850	
	35	3600	
	41	4800	
Vacuum - manifold	Starts 7	Ends 13	Max 6 degrees

18V 672/673 USA & Canada 72-74	25D4 41491 (LC)		
	Degrees	RPM	Chart
Dwell	60+-3		
Static	6		
Strobe	11	1500	
Centrifugal	16	2025	
	32	3825	
	39	4800	
Vacuum - manifold	Starts 10	Ends 15	Max 10 degrees

18V 779/780 ECE15, not North America, Nov73-Sep74 (chrome bumper), HIF carbs	25D4 41234/41391 (HC)		
	Degrees	RPM	Chart
Dwell	60+-3		
Static	6		

Strobe	11	1000	
Centrifugal	0.5	600	
	4	1200	
	12	2200	
	22	3600	
	28	4500	
	30	6000	
Vacuum - carb ... confirmed	Starts 4	Ends 12	Max 16 degrees

18V 846/847, Not North America, Sep74-80 (rubber bumper)	45D4 41610 (HC)		
	Degrees	RPM	Chart
Dwell	51+-5		
Static	7		
Strobe	10	1000	
Centrifugal	0.5	600	
	3	1600	
	8	2600	
	12	3400	
	17	4400	
	22	5400	
	24	6400	
Vacuum - see Note	Starts 3	Ends 11	Max 24 degrees

Note: Manifold vacuum. Clausager shows a 1975 model with it coming off the top of the front carb although there seems to be a manifold port capped off as well. This must be a user modification, done incorrectly, as MGB HIF carbs have the butterfly opening the other way compared to HS carbs, which is why the port is on the bottom of CB and V8 HIFs.

18V 836/837 USA & Canada 74 1/2 18V 797/798 USA 74-75 Canada 74-76	45D4 41599 (LC)		
	Degrees	RPM	Chart
Dwell	51+-5		
Static	7		
Strobe	13	1500	
Centrifugal	18	2000	
	32	4000	
	36	5000	
Vacuum - manifold	Starts 10	Ends 15	Max 10 degrees

18V 797/798 California 75	43/45DE4 41643 (LC)		
	Degrees	RPM	Chart
Dwell	n/a		
Static	not given		
Strobe	10	1500	

Centrifugal - max	35	4500	n/a
Vacuum - n/a			

Note: Although there is no mention in Clausager or the Leyland Workshop Manual and Parts Catalogues in my possession, Moss USA, Doug Jackson and TDC Engineering indicate this distributor could either be a 43DE4 with no vacuum capsule or a 45DE4 with capsule and plumbing. In the latter case the points plate could be pinned to prevent movement if it was the only way to get an individual car through the emissions test. Moss info on when this distributor was used varies between its downloadable PDF catalogue and its online catalogue. A high level of warranty failures meant that this unit was often replaced by the 43/45DM4 41815 unit below.

18V 797/798 California 75 18V 801/802 USA 76	43/45DM4 41815 (LC)		
	Degrees	RPM	Chart
Dwell	n/a		
Static	not given		
Strobe	10	1500	
Centrifugal - max	15	2600	n/a
Vacuum - manifold	n/a	n/a	n/a

Note: Although there is no mention in Clausager or the Leyland Workshop Manual and Parts Catalogues in my possession or TDC Engineering, Moss USA and Doug Jackson indicate this distributor could either be a 43DE4 with no vacuum capsule or a 45DE4 with capsule and plumbing. In the latter case the points plate could be pinned to prevent movement if it was the only way to get an individual car through the emissions test. Moss info on when this distributor was used varies between its downloadable PDF catalogue and its online catalogue. Often used for warranty failures of the 43/45DE4 41643 unit above.

18V 801/802 USA 75-76	45DE4 41600 (LC)		
	Degrees	RPM	Chart
Dwell	51+-5		
Static	7		
Strobe	10	1500	
Centrifugal	15	2000	
	30	3500	
	35	4500	
Vacuum - n/a			

18V 883/884 USA 76-80 except California	45DE4 41693 (LC)		
	Degrees	RPM	Chart
Dwell	51+-5		

Static	7		
Strobe	10	1500	
Centrifugal (Advance check - 19 @ 2000 vac disconnected)	35	4500	
	30	3500	
	15	2000	
Vacuum - manifold	Starts 3	Ends 11	Max 24 degrees

Note 1: From July 76 (some), February 77 (all) vacuum advance available in 4th gear only.
Note 2: Moss (PDF catalogue only) information indicates this was often replaced by the 45DM4 41813 under warranty.

18V 890/891 Californian 76-79 Japan 80	45DE4 41695 (LC)		
	Degrees	RPM	Chart
Dwell	51+-5		
Static	7		
Strobe	10	1500	
Centrifugal (decelerating) Advance check - 19 @ 2000 vac disconnected	35	4500	
	30	3500	
	15	2000	
Vacuum - manifold	Starts 5	Ends 11	Max 14 degrees

Note 1: From July 76 (some), February 77 (all) vacuum advance available in 4th gear only.
Note 2: Moss (PDF catalogue only) information indicates this was often replaced by the 45DM4 41813 under warranty.

18V 892/893 Canada 76-80	45D4 41692 (LC)		
	Degrees	RPM	Chart
Dwell	51+-5		
Static	7		
Strobe	13	1500	
Centrifugal (decelerating) Advance check - 22 @ 2000 rpm vac disconnected	36	5000	
	32	4000	
	18	2000	
Vacuum - manifold	Starts n/a	Ends n/a	Max 24 degrees

Note: From July 76 (some), February 77 (all) vacuum advance available in 4th gear only.

18V 883/884 18V 890/891 USA 77-79	45DM4 41813 (LC)		
	Degrees	RPM	Chart
Dwell	n/a		
Static	not given		
Strobe	10	1500	
Centrifugal - max	15	2600	n/a
Vacuum - manifold	Starts 3	Ends 11	Max 24 degrees

Note: From July 76 (some), February 77 (all) vacuum advance available in 4th gear only.

18V 883/884 18V 890/891 USA 77-79	45DE4 41814 (LC)		
	Degrees	RPM	Chart
Dwell	n/a		
Static	not given		
Strobe	10	1500	
Centrifugal - max	15	2600	n/a
Vacuum - manifold	Starts 5	Ends 11	Max 14 degrees

Note: From July 76 (some), February 77 (all) vacuum advance available in 4th gear only.

18V 883/884 18V 890/891 USA 80	45DM4 41851 (LC)		
	Degrees	RPM	Chart
Dwell	n/a		
Static	not given		
Strobe	10	1500	
Centrifugal - max	16	2600	n/a
Vacuum - manifold	Starts 3	Ends 11	Max 24 degrees

Note: From July 76 (some), February 77 (all) vacuum advance available in 4th gear only.

18V 883/884 18V 890/891 California 80	45DM4 41853 (LC)		
	Degrees	RPM	Chart
Dwell	n/a		
Static	not given		
Strobe	10	1500	
Centrifugal - max	16	2600	n/a
Vacuum - manifold	Starts 5	Ends 11	Max 24 degrees

Note: From July 76 (some), February 77 (all) vacuum advance available in 4th gear only.

Special Tuning Stage 3/4 1967 on	25D4 40943		
	Degrees	RPM	Chart
Dwell	60 +-3		
Static	6 (suggested)		
Strobe	not given		
Centrifugal	0	400	
	4	550	
	8	700	
	12	850	
	16	1000	
	18	1550	
	20	2100	
	22	2700	
	24	3250	
Vacuum - none			

Aldon Distributor	101BR2		
	Degrees	RPM	Chart
Dwell	51 +-3 (gap 0.013)		
Static	12		
Strobe	Not known		
Centrifugal	0	500	
	2	600	
	6	1000	
	10	1400	
	14	1800	
	18	2200	
	20	2600	
Vacuum - not fitted			

Posted by Jeff Schlemmer, Minnesota, USA. *February 2011:* However note that Aldon info indicates the 101BR1 has no vacuum, 101BR2 is the vacuum equivalent. Graham Gilmore contacted me with the dwell, gap and timing info, and also to say that the data sheet supplied with his unit contained incorrect information which made the engine run very poorly!

Factory V8

Distributor. Distributors for the 4-cylinder cars can be found here.

Factory V8	35D8 41394		
	Degrees	RPM	Chart
Dwell	26-28		
Strobe	8	1000	
Centrifugal	11	1300	

	16	1600	
	21	2000	
	26	2600	
	30	3600	
	35	4900	
Vacuum - carb	Starts 5	Ends 11	Max 16 degrees

Other sites with distributor info:

- TDC Engineering - for all applications not just MG
- Doug Jackson's 'British Automotive'
- Paul Tegler
- AutoChart Inc
- Lucas catalogue from Collector's Auto Supply

http://www.mgb-stuff.org.uk/