

# গতকাল

Part 6 of 9





Welcome to Get To Know Your 7. This is a download copy of a series of articles looking at the essentials of routine maintenance for your Seven. These first appeared in the Lotus 7 Club magazine 'Lowflying' between August 2010 and May 2011.

Each article will be a separate download and below is a table of contents as to which articles are in this series. The article you are currently looking at will appear in bold in the table of contents.

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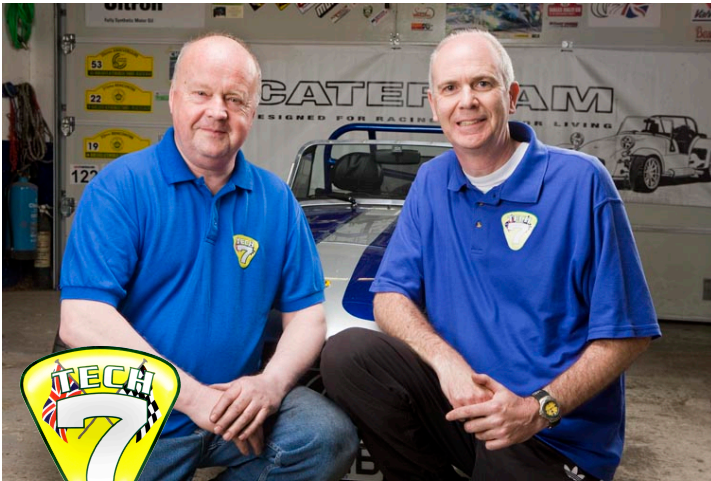
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In This issue we begin a major series looking at the essentials of maintaining your Seven. Even if you don't want to become a home mechanic, we hope this will encourage you to learn a little more about your car.

The notes for this series are prepared by **Andy Belcher, Rob Davis** and **Michael Calvert**, and the photographs are by **Jamie Jones**. *So, let us begin...*



Road & Track  
Engineering Solutions

*Andy Belcher (left) and Rob Davis*

## Introduction

**Owning a Seven** can bring you a wide range of experiences; one of these is the opportunity to carry out the servicing of the car yourself. Although many prefer to entrust the maintenance of their 'pride and joy' to one of the many specialist garages available, carrying out your own servicing can save you money, provide immense satisfaction and bring you a step closer to understanding the running of your car.

Over the coming months, this series of articles will build upon the theme of the Get to Know Your Seven (GTKY7) experience days which have been regularly organised through the Club, and extend into providing an overview of the basic tasks and procedures required to maintain your Seven.

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### **During this series, we'll be looking at the following:**

Raising and lowering the car

- including front and rear axle stand positions and trolley jack lifting points

Engine and transmission oil

- oil change for dry sump and wet sumps,
- oil filter removal and re-fitting,
- checking and topping-up gearbox oil,
- changing gearbox oil (specific models),
- checking and topping-up differential oil,

Front wheel bearings

- checking bearings for excessive play

Wheel and tyres

- checking tyre condition and tread depth,
- wheel nut re-tightening torques

Brakes

- checking condition of discs,
- checking brake pad thickness,
- changing brake pads,
- handbrake operation

Suspension

- general suspension security checks,
- lubricating trunnions (where appropriate),
- A-frame bush

Prop-shaft

- greasing universal joints on prop shaft (Series 3 and SV)

Fuel system

- checking fuel lines for security and leaks
- changing fuel filter
- carburettor balance and idle settings

Fluids

- checking coolant, brake and clutch fluid

Air filter

- checking and changing air filters

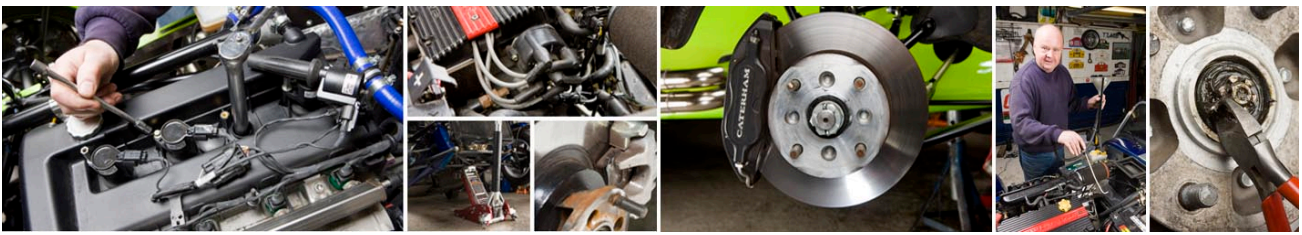
General inspection items

- exhaust condition, lights and bulbs, CV gaiters, hose condition and security, drive belts, headlight alignment, battery condition, engine mounts, wiper condition, seatbelts

Steering

- steering wheel alignment and play in steering rack

Vehicle underside condition



Safety is a very important issue when working on the car, so you must take the appropriate precautions; specific examples of this will be emphasised as part of this series. It goes without saying that no work on any safety related area should be undertaken unless the person undertaking that work is fully confident in being able to complete the tasks to the required standard. Certain more complex jobs, outside of routine servicing, should only be tackled by a competent professional, or at least with experienced help. If in doubt, a request for help on BlatChat or at your local Club meeting is more likely than not to result in the offer of assistance.

The CSR benefitted from many technical developments over Caterham's more traditional variants, including inboard front suspension, independent rear suspension (and a Cosworth-developed engine); the csr presents certain particular servicing considerations over the more familiar Series 3 cars. But as far as possible this series is targeted at the broad spectrum of Caterham owners across Series 3, SV and CSR variants.

Undertaking a yearly service will require you to have a basic knowledge of the workings of the car—however it does not require you to be a mechanic or expert. This series of articles will take you through the service procedure, identifying any specific tools and parts required. Relevant pictures will add to the understanding of the steps, along with particular safety instructions. For owners who have not undertaken such tasks before, or maybe are not confident at this stage, we hope to provide encouragement in understanding the workings of the Seven and a better understanding of what a garage would do on your behalf as part of the service regime.

We begin with a resumé of the main chassis types of the various Caterham cars—as those differences in configuration can dictate some differences of procedure.

### **The essential differences...**

The Caterham Seven has many different chassis and engine variants, so it is not possible to comprehensively cover every type here in great detail. Therefore, we will discuss general procedures and checks which should be applicable to most cars, highlighting where they are relevant only to certain cars. The most important thing to understand initially, therefore, is which car chassis and engine type you have...

**The Series 3** chassis has traditionally been the main version supplied by Caterham, but many designations have been used for different models within the Series 3 range, based on combinations of engine, major components and interior—these include the model names such as Supersprint, hpc, Classic, Supersport and Superlight.

The basic dimensions of Series 3 chassis can trace their origins to the Lotus Seven Series 3, although improvements such as the option of a 'Long cockpit' chassis from 1982, to improve comfort for the taller driver, and the introduction of the 'de Dion' rear suspension from 1985 in place of the 'live axle' were just some of the changes implemented by Caterham over the years.

Engines offered with the Series 3 chassis have been many and varied, but most popular over time have been Ford Crossflow (or 'Xflow'), Vauxhall 16v and 8v, Rover K-series, and most recently Ford Sigma.

**The SV** ('Series 5') chassis, whilst sharing similar external proportions to the Series 3, has increased length and width to provide added cockpit and storage space. These cars also use the de Dion rear suspension and are powered by Rover K-series and Ford Sigma or Duratec engines.

**The CSR** represents the latest chassis development (apart from subsequent detail changes to the s3) introduced in 2005 and is of different construction to the Series 3 or SV, with fully independent rear suspension and inboard, push-rod type, front suspension. The engine fitted to this car in the uk is the 2.3 litre Ford Cosworth Duratec; internationally, the 2.0 litre is now also available in eu4 variant.

We begin the series, with something straight forward but fundamental: Spark plugs and distributor; steering and driveshaft gaiters; steering column clamp; exhaust conditions.

**Part 1: Spark plugs and distributor; steering and driveshaft gaiters; steering column clamp; exhaust condition**



In this instalment we explain the procedures for attending to various service items on the car. Each of the Seven's variants through the s3, sv, and csr will present slight differences to some of the pictures shown here; however the general procedures outlined here will enable the principles to be followed for the vast majority of cars.

**Spark plugs: CSR**

Access to the csr's spark plugs requires the removal of the composite cover on top of the camshaft housing. This is simply removed by undoing the two t30 size Torx screws shown in **Fig 1**. Take care not to lose the small washers on either side of the retaining screws. Remove the cover; the rubber grommet slides out of its u-shaped cut-out in the carbon cover.

The plugs on the csr each have a 'pencil' coil pack fitted. To remove each of these, first undo the 10mm and 8mm retaining bolts as shown in Fig 2, then pull the coil off the spark plug; little force is necessary to achieve this. The spark plug can then be removed using the long-reach 16mm plug wrench or socket. Withdraw the plug and examine the condition of the electrode as this is a good indicator of the health of the engine.

Under ideal conditions there should be a light brown deposit on the electrode and surrounding plug housing. Black sooty deposits would indicate a rich fuel mixture, oil would indicate worn piston rings, and a glazed appearance could indicate overheating.

Most Seven owners replace their plugs each year, simply because the cost is minimal. The gap should be set at 0.026" (0.66mm) for the csr's ngk br7efs

**Safety Points:**

Take care if the car is to be raised; safe use of jack and axle stands was covered in Part 1 of this series.

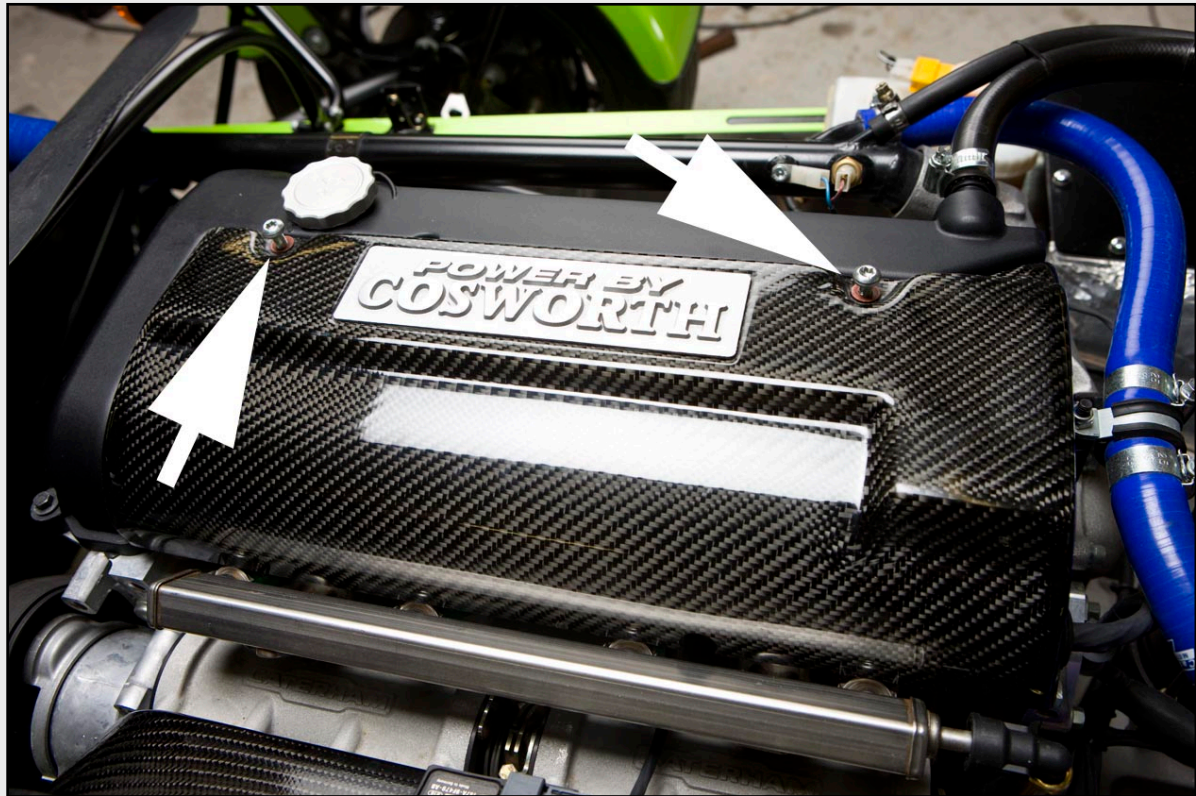
**Equipment required:**

**Tools:**

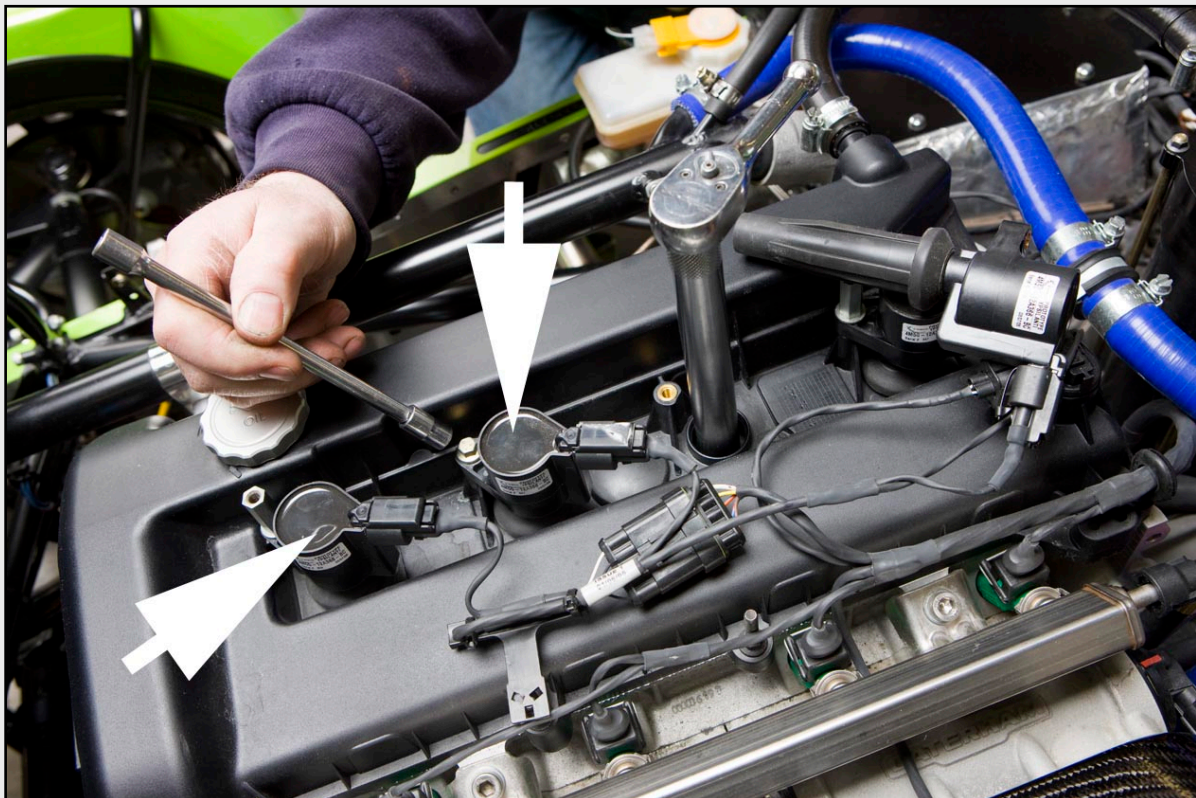
- Socket set
- Spark plug wrench or socket: long-reach 16mm for most (Older engines such as Xflows will use an Imperial size – these are sometimes labelled for the plug's thread diameter rather than the equivalent 'spanner' size 'across the flats'; so do check before buying!)
- For CSR, a Torx screwdriver or bit
- Inspection lamp
- Jack and axle stands

**Parts:**

- Spark plugs – check owner's handbook or plug manufacturer's data
- Copper ease/Copaslip



**Fig 1:** on the CSR cars, the spark plugs are hidden by the moulded cover, which is held in place by Torx-head screws (arrowed).



**Fig 2:** unscrewing the retaining bolts which hold in place the individual coils (arrowed) above each spark plug; and using the long-reach spark plug socket and a ratchet to remove the plug itself.



On the K-series engine, the plugs are, as on the CSR beneath a cover although in this case a narrow metal one along the centre of the cam cover. Later versions also use individual coil packs for each plug and the set up is similar in principle to the CSR. See text.

Figs 4 and 5, above and next page: with the plug cover removed, the leads can be pulled off and the plugs then removed with the long-reach socket.



Figs 5, with the plug cover removed, the leads can be pulled off and the plugs then removed with the long-reach socket.



plugs. It is good practice to smear a little Copper ease or Copaslip (copper-based 'grease' sometimes referred to as an anti-sieze compound) onto the threads of the new spark plug prior to refitting. This will ensure ease of removal next time.

It is important to start the thread of the new plug (using the socket or wrench again), carefully and gently; this is to avoid cross-threading which will damage the cylinder head. Tighten the plug finally to 12nm. Refit the coil and retaining bolt and tighten (hand-tight).

Repeat this procedure for the remaining plugs. Refit the cover and hand-tighten the two screws.

If you are not replacing the spark plugs, it is good practice to gently remove any deposits from the old ones and recheck the electrode gap using an engineering feeler-gauge. A soft wire brush, or fine emery paper is good for removing any deposits.

### **Spark plugs: K-series**

It should be noted that the k-series engine, eu3 variant, uses coil packs within the removable cam-cover top broadly similar to the csr. However, the eu2 engine uses conventional High Tension leads and a distributor cap, rather than individual coils. The general principle for the eu2 may vary from model to model, but is outlined below.

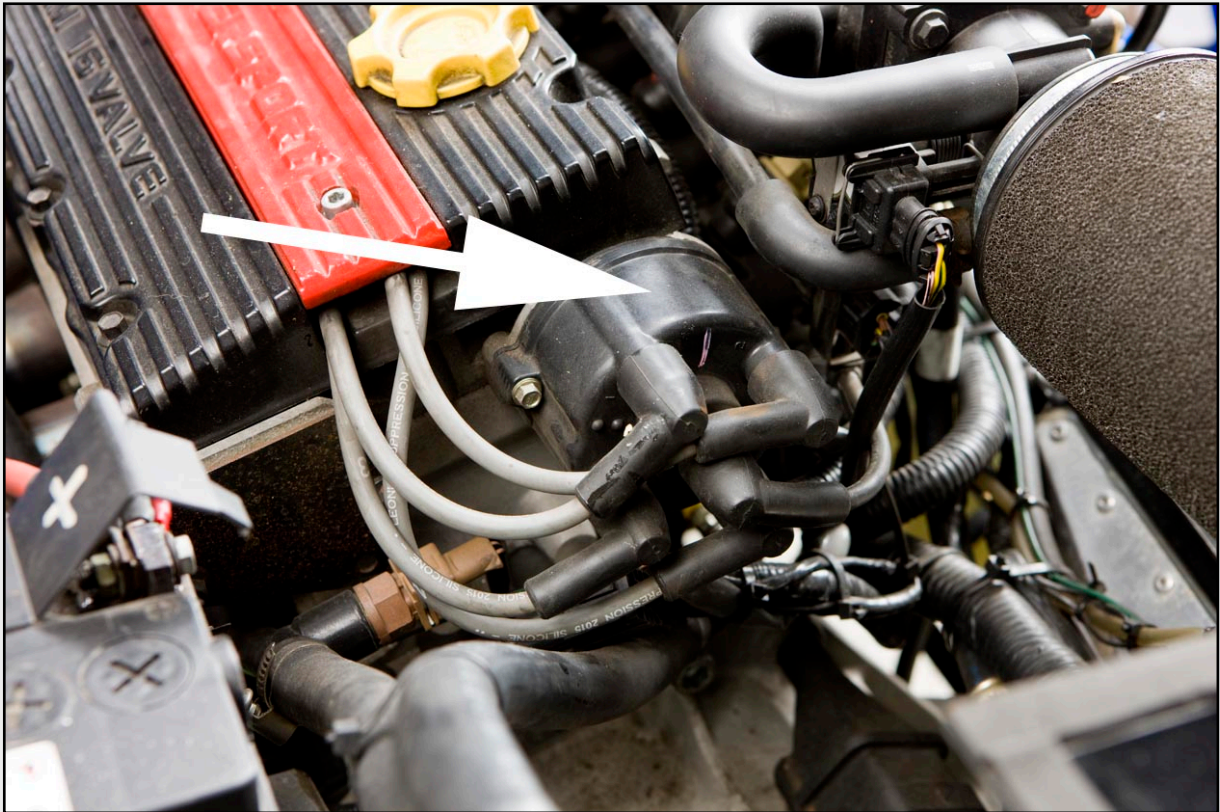
First, remove the plug cover, as shown in **Fig 3**, to expose the tops of the spark plug and the ht leads. Grip and pull the ht fitting off the end of the spark plug by hand. Using a long-reach plug wrench, undo the plug and remove it for examination, as shown in **Fig 4**. The typical deposits on the plug electrode should be seen, as discussed earlier for the csr. The electrode gap for your car will vary with engine specification; check your owner's handbook or manufacturing data for this information. Smear the plug thread with copper- ease or copaslip prior to fitting and tighten by hand to the specified torque. Do not over tighten. Re-fit the ht plug lead and press home to ensure contact. Repeat this procedure on the remaining plugs.

The k-series engine (eu2 variant) also has a conventional distributor fitted which does require periodic maintenance to remain in good condition. The distributor (if fitted to your model) will look similar to **Fig 5**.

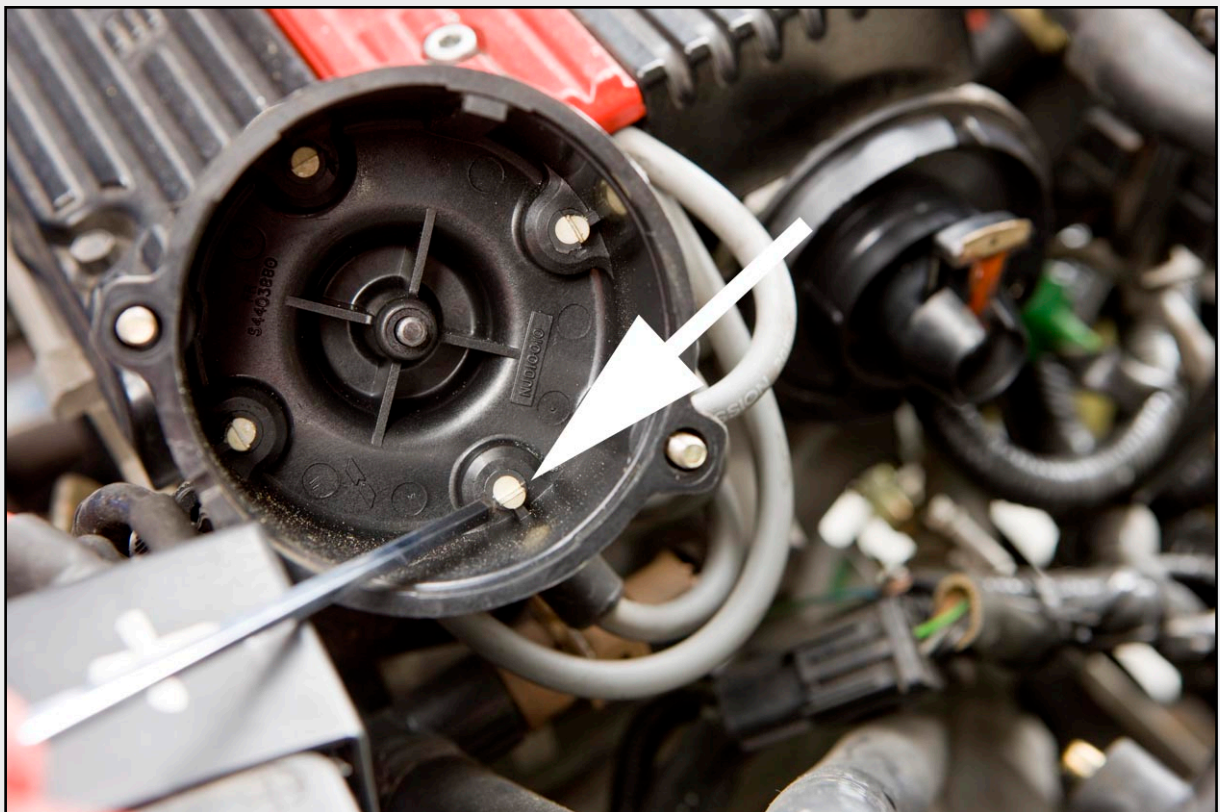
### **Distributor: K-series (where fitted).**

It is important to examine, yearly, the general condition and electrical contacts within the distributor.

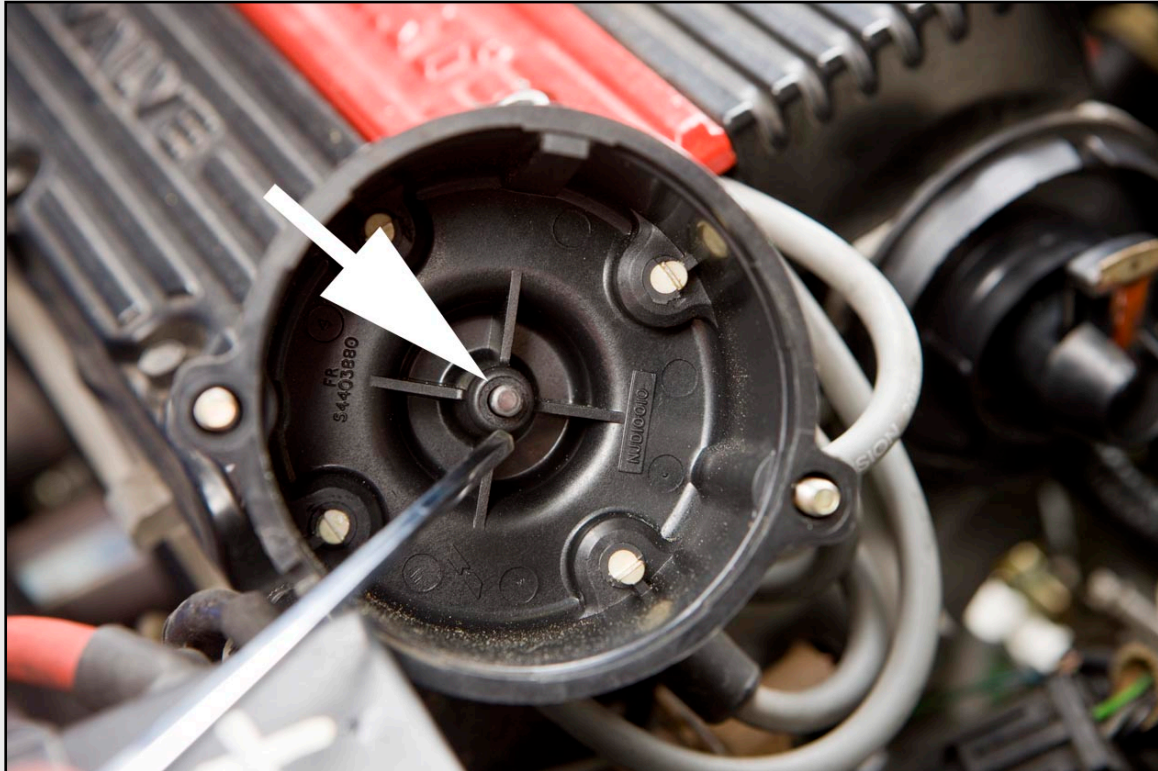
To remove the cap, shown in **Fig 5** (overleaf) first take note of its orientation so that you can be sure of refitting it correctly, then release the two retaining screws or clips and it can now be gently removed. Examine the general condition of the distributor cap, particularly looking for



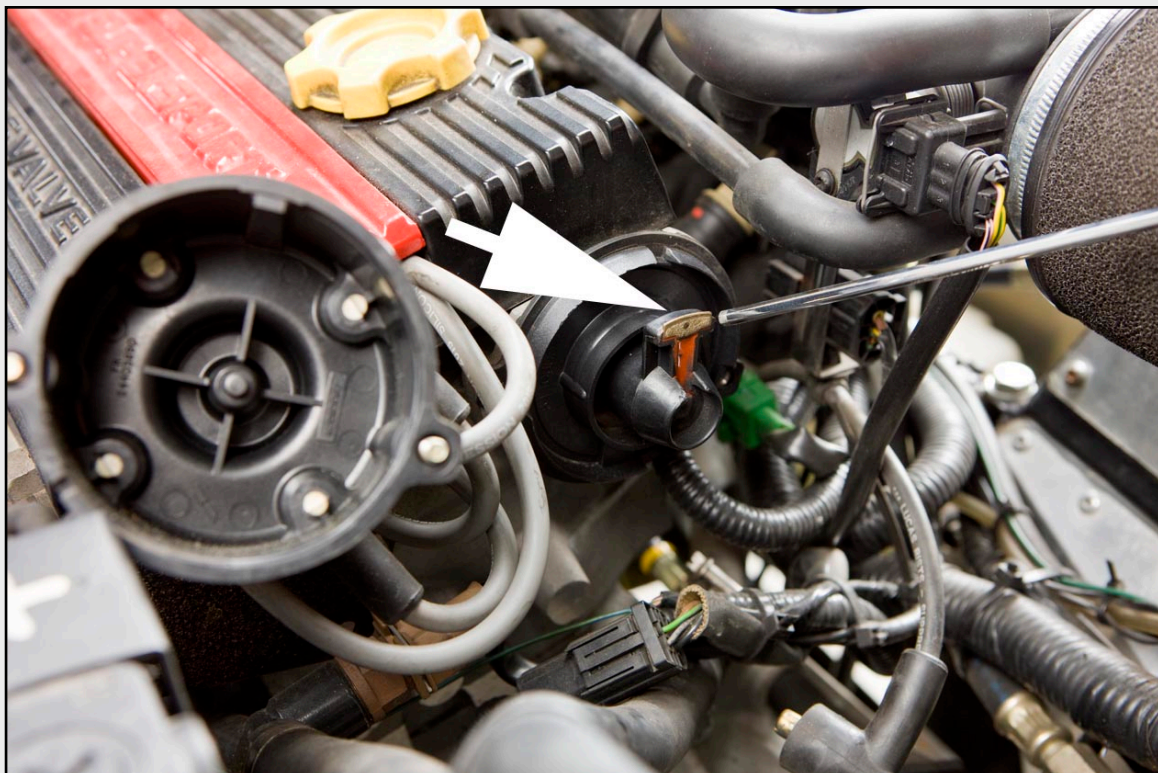
**Fig 5:** the distributor, when fitted to a K-series engine is mounted on the back of the cylinder head and driven by the inlet camshaft. (Distributor cap and spark plug leads are arrowed)



**Fig 6:** with the cap removed and turned over, the four contact points can be seen around the inside; these should be checked for wear and the cap itself checked for cracks or other damage.



**Fig 7:** the centre contact should be checked also; this is normally spring-mounted so it should be free to press in under light pressure.



**Fig 8:** the tip of the rotor (again, arrowed) is another wear-point to examine. (The rotor tip passes across the four contacts in Fig 6 as it turns.)

any signs of cracks in the plastic. Also examine the four rotor contacts on the cap and the centre contact identified in **Figs 6 and 7**. If these are significantly worn, corroded or damaged, you should replace the distributor cap.

Examine the tip of the rotor, shown in **Fig 8**, again for signs of significant wear. Replace if in doubt. Replace the distributor cap, and secure the retaining screws or clips.

**NOTES:**

In issue 7, Suspension, prop shaft, fluid levels, fuel system...

