

# INTRODUCTION

This Workshop Manual has been compiled to assist Service Personnel, responsible for maintenance and overhaul, in correctly maintaining the high standard of engineering achieved in the production of the Rolls-Royce Silver Shadow and Bentley T series cars.

The Manual is copiously illustrated and provides complete information on the dismantling procedure, inspection, assembly and special tools. Fault Diagnosis Sections have been included in some Chapters to enable obscure defects to be remedied speedily. Also included in the Manual at the end of most Chapters is a list of Dimensional Data which should be referred to when assessing wear or damage during overhaul.

Although all information contained in this Manual was correct when going to print, modifications which may subsequently develop will be kept up-to-date by amended pages.

Any information which cannot be dealt with satisfactorily by amended pages will, in the first instance, be issued in the form of a Service Bulletin.

Where a Service Bulletin is issued, it is advisable to endorse the relative page(s) in the Manual so that any subsequent reference to the Manual will reveal immediately that the page(s) content is affected by a Service Bulletin.

Service personnel at the appropriate address shown overleaf are always prepared to answer queries or give advice on individual servicing problems but it will assist them if enquiries are accompanied by the car serial numbers.

Every reasonable effort has been made to ensure that the information contained in this Publication is correct when going to print, however, as Rolls-Royce policy is one of continuous engineering improvement, the right is reserved to revise the contents without prior notice.

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# **Chapter A**

## **GENERAL INFORMATION**

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# SECTION A1

## SPECIFICATION

Type	Over square 90° formation
Number of cylinders	Eight in two banks of four
Bore	10,41 cm. (4.1 in.)
Stroke	Cars prior to serial number 8742 - 9,14 cm. (3.6 in.) Cars from serial number 8742 - 9,91 cm. (3.9 in.)
Total capacity	Cars prior to serial number 8742 - 6,23 litres (380.5 cu.in.) Cars from serial number 8742 - 6,75 litres (411.9 cu.in.)
Compression ratio	9:1, 8:1 or 7.3:1 according to car's intended domicile.
Engine and transmission mounting points	The engine and transmission are flexibly mounted on rubber at three points; single mounting at the front, two at the rear
<b>Material</b>	<b>Camshaft</b> Alloy cast iron
<b>Bearings</b>	Surfaces machined in crankcase
<b>Thrust taken</b>	On front end
<b>Drive</b>	Through helical gears
<b>Type</b>	<b>Connecting rods</b> The connecting rods are 'H' section forgings and are balanced before fitting to the engine
<b>Material</b>	Chrome molybdenum steel
<b>Big-end bearings</b>	Split steel backed shells lined with 20% tin aluminium
<b>Small-end bushes</b>	Pressed into connecting rod small-end bosses
<b>Material</b>	Lead-bronze, steel backed
<b>Description</b>	<b>Crankshaft</b> Dynamically balanced two-plane crankshaft with four crankpins and integral balance weights; bolted on balance weights from car serial number 8742

## **Chapter A**

Damping	Bonded rubber vibration damper
Direction of rotation	Clockwise (when viewed from front of engine)
Type	<b>Cylinder block</b> Monobloc casting
Material	Cast aluminium alloy
Description	<b>Cylinder heads</b> Two detachable heads, each having four separate inlet and exhaust ports
Material	Aluminium alloy, with phosphor bronze exhaust valve guides, cast iron inlet valve guides and valve seat inserts of alloy cast iron
Type	<b>Cylinder liners</b> Detachable wet liners
Material	Cast iron
Type	<b>Main bearings</b> Split steel backed shells lined with 20% aluminium
Type	<b>Pistons</b> The pistons are the full skirt type with off-set gudgeon pins. The crown of the pistons differ to give a compression ratio of 7.3:1, 8:1, or 9:1 dependent upon the car's intended domicile
Material	Aluminium alloy
Number of rings	Four. Three compression rings and one scraper ring or from car serial number 8742 Three. Two compression rings and one oil control ring
Inlet valves	<b>Valve gear</b> Overhead push rod operated. Single spring with steel collets, seals attached to collets control valve stem lubrication
Material	Alloy steel
Exhaust valves	Overhead push rod operated. Single spring with steel collets, seals attached to collets control valve stem lubrication
Material	Austenitic steel with stellite tip and valve seat
Tappets	The engine is fitted with self-adjusting hydraulic tappets. The base of each tappet has a spherical radius
Material	Alloy cast iron
Push rods	The push rods are hollow and have hardened spherical ends

**Lubrication system**

Type	Wet sump
High pressure supply	2,6 kgf/sq.cm. (37 lbf/sq.in.) at 1 000 r.p.m.
Relief valve	2,8 kgf/sq.cm. (40 lbf/sq.in.)
Oil pump	Helical gear type with fine mesh strainer pick-up
Oil filter	Full flow type with filter by-pass relief valve

**Cooling system**

Type	Solid coolant system
Pump type	Centrifugal
Pump drive	Adjustable twin 'Vee' belts
Radiator matrix type	Tube and fin construction
Fans	Located to the rear of the radiator
(a) cars prior to serial number 6300	(a) Five blades. 45,72 cm. (18.0 in.) diameter
(b) cars from serial number 6300	(b) Seven blades. Viscous drive coupling 50,8 cm. (20.0 in.) diameter
Electric booster fan	Located forward of the radiator. 30,5 cm. (12.0 in.) diameter plastic fan with seven blades
From car serial numbers	
Silver Shadow and Bentley T - 24482	
Corniche - 24431	
Coolant temperature controlled by thermostat opening temperature.	
Prior to car serial numbers	
Silver Shadow and Bentley T - 2832	
Corniche - 2986	79.5° C. to 83.5° C. (175° F. to 182° F.)
From car serial numbers	
Silver Shadow and Bentley T-2832	
Corniche - 2986	85° C. to 89° C. (185° F. to 192° F.)
System pressurised at	1,05 kgf/sq.cm. (15 lbf/sq.in.)
Coolant	Anti-freeze - 50% mixture
Cars destined for countries other than U.S.A. and Canada	Prestone anti-freeze and summer coolant UT184, renewed annually.
Cars destined for U.S.A. and Canada	Prestone II Winter/Summer concentrate, renewed annually. The two Prestone materials are miscible. Do not mix with different types of anti-freeze at any time

<b>Make</b>	<b>Lucas</b> : HA 12 negative earth : BA 7 negative earth with ballast resistance : 16 C 6 negative earth with ballast resistance : 22 C 12 negative earth with ballast resistance : 23 C 12 negative earth with ballast resistance
Late cars destined for countries other than Australia, Canada, Japan and the U.S.A. Late cars destined for Australia, Canada, Japan and the U.S.A.	
<b>Make and type</b>	<b>Lucas</b> : 20 D 8 - contact breakers Dwell angle 31° to 37° : 35 D 8 - contact breakers Dwell angle 26° to 28° : 35 DE 8 - Opus electronic Dwell angle 33° to 39° at 1 000 r.p.m.
Cars from serial number 11188	
Cars from serial number 22118	
<b>Rotation</b>	Anti-clockwise, viewed from the top
<b>Advance mechanism</b>	Automatic centrifugal advance
<b>Firing order</b>	A1, B1, A4, B4, B2, A3, B3, A2. 'A' bank is on the right when viewed from the driver's seat
<b>Drive</b>	Through camshaft skew gears
<b>Make and type</b> Cars from serial number 22118	<b>Champion</b> : N 14 Y : RN 14 Y
<b>Gap setting</b> Cars prior to serial number 22118	0,58 mm. to 0,71 mm. (0.023 in. to 0.028 in.)
Cars from serial number 22118 Cars destined for countries other than Australia, Canada, Japan and the U.S.A.	0,76 mm. (0.030 in.)
Cars destined for Australia, Canada, Japan and the U.S.A.	0,89 mm. (0.035 in.)
<b>Make and type</b>	<b>Generator</b> Lucas C 48
<b>Make and type</b>	<b>Generator control box</b> Lucas RB 340
<b>Make and type</b>	<b>Alternator</b> Lucas 11 AC C.A.V. 512 C.A.V. AC 5B/12/53

Make and type

**Alternator control**

Lucas 4 TR - fitted with Lucas 11 AC alternator  
C.A.V. 440 type 546 - fitted with C.A.V. alternators

Make and type

**Starter motor**

Lucas M 45 G

Make and type  
Drive**Refrigerant compressor**

Frigidaire 204,8 cu. cm. (12.5 cu. in.)  
Twin 'Vee' belts

Make and type  
Choke size  
Jet size**Carburettors**

Twin S.U. HD8. Automatic choke  
5,08 cm. (2.00in.) diameter bore  
3,175 mm. (0.125 in.) Fixed needle type  
2,44 mm. (0.100 in.) Spring loaded needle type

Make and type

**Air filter/silencer**

Either an oil wetted wire mesh filter (early cars)  
or a Purolator paper type element

Make and type

**Fuel pumps**

Twin S.U. electric type AUF 400

Capacity

**Fuel tank**

107 litres (23.5 Imp. gal., 28 US. gal.)

Location

**Fuel filter**

Main fuel filter in the fuel line between the fuel  
tank and carburettors. Small gauze filters at the  
carburettor inlets (early cars) disposable paper  
filter elements (late cars)

General

**Four Speed automatic gearbox**

Fitted to right-hand drive cars prior to serial  
numbers SRH 4483 (excluding SRH 4486) and prior  
to SBH 4476

General

**Torque converter transmission  
(GM 400 - 3 speed)**

Fitted to all left-hand drive cars. Also to right-hand  
drive cars after serial numbers SRH 4483  
(excluding SRH 4487) and SBH 4475

Description

**Propeller shaft**

Single piece shaft incorporating resonance dampers



### **Final drive unit and drive-shafts**

Crown wheel teeth	40
Bevel pinion teeth	13
Final drive unit ratio	3.08:1
Top gear speed per 1 000 r.p.m.	42,3 k.p.h. (26.3 m.p.h.)

### **Braking system**

Fluid	Castrol RR 363 brake fluid. This fluid exceeds current S.A.E. J1703 specifications in many respects and complies with D.O.T. 3 grade of FMVSS 116
Maximum operating pressure (pump cut-out pressure)	175,77 kgf/sq.cm. (2 500 lbf/sq.in.)
Pump cut-in pressure (2 settings)	(a) 130,06 kgf/sq.cm. to 133,58 kgf/sq.cm. (1 850 lbf/sq.in. to 1 900 lbf/sq.in.) early cars (b) 126,55 kgf/sq.cm. (1 800 lbf/sq.in.) late cars
Caliper type	
Front (2 types)	Four T16 calipers (cars prior to serial number 15950) Four M16 calipers (cars from serial number 15950)
Rear (2 types)	Two T11/14 calipers (cars prior to serial number 22118) Two T11/11 calipers (cars from serial number 22118)
Brake pads (four types)	Ferodo DC1, Mintex M69, Mintex M170 and Mintex V1431
Pad area (service brake)	
Front	304,5 sq.cm. (47.2 sq.in.)
Rear	237,3 sq.cm. (36.8 sq.in.)
Swept area	
Front	1459,35 sq.cm. (226.2 sq.in.)
Rear	1578,06 sq.cm. (244.6 sq.in.)
Total	3037,41 sq.cm. (470.8 sq.in.)
Disc diameter	27,94 cm. (11.0 in.) nominal
Disc width	
Front	1,60 cm. (0.630 in.)
Front (vented type)	3,18 cm. (1.250 in.)
Rear	1,27 cm. (0.500 in.)

### **Wheels and tyres**

Wheels	
Rim (2 types)	(a) 6 JK x 15 in. (b) 6 JK x 15 in. flat ledge
Type	Disc - pressed steel
Fixing	5 stud - right-hand wheel nuts have right-hand threads, left-hand wheel nuts have left-hand threads

## Tyres

## (a) Prior to car serial numbers

Silver Shadow and Bentley T

SRH 13485 (except SRH 13066, SRH 12853,

SRX 12687 and SRH 12586)

Long Wheelbase LRX 13201 (except LRH 13084)

Corniche Convertible DRX 12734

Corniche Saloon CRX 12735

8.15 15 cross-ply 205 15 radial-ply

**Note**

Prior to car serial numbers

Silver Shadow SRX 6752

Bentley T SBH 5572

Coachbuilt CRH 6760

Long Wheelbase LRX 6744

(except LRX 6712, LRX 6714 and LRX 6720)

Only tubed radial tyre equipment should be fitted

## (b) Cars from and including the following car serial numbers up to those quoted in (c)

205 15 radial-ply

Silver Shadow and Bentley T

SRH 13485 (including SRH 13066,

SRH 12853, SRX 12687 and SRH 12587)

Long Wheelbase LRX 13201 (including LRH 13084)

Corniche Convertible DRX 12734

Corniche Saloon CRH 12735

All cars from these car serial numbers **must** always be fitted with radial-ply tyre equipment.

## (c) All cars from and including the following car serial numbers

Silver Shadow SRC 18269

Bentley T SBH 18265

Long Wheelbase LRH 19577

Corniche Convertible DRH 18563

Corniche Saloon CRH 18564

HR 70 HR 15 (235/70 HR 15)

Recommended tyre inflation pressures cold

Refer to Chapter R - Wheels and tyres

**Steering and suspension**

Automatic height control system

Maximum working pressure

Pump cut-out pressure

Pump cut-in pressure

See Braking System on Page A6

Minimum pressure for height control operation

80,85 kgf/sq.cm. (1 150 lbf/sq.in.)

Type

**Steering**

Recirculating ball

Turns of steering wheel lock-to-lock (3 changes)

4, 3.5, 3.25

Front and rear hubs

Taper roller bearings

## Chapter A

### Front wheels steering geometry

Camber (in degrees)	0° to 1° negative
Kingpin inclination (in degrees)	11°
Caster (in degrees) Cars produced prior to serial numbers SBH 3349 and CRH 3449	1½° positive ± ¼°
Cars produced after and including car serial numbers SBH 3349 and CRH 3449	3° positive ± ¼°
Cars produced after and including car serial numbers Silver Shadow and Bentley T - 13485 Comiche - 12734	2° 30' to 3° 30' positive
Toe-in	1,58 mm. to 3, 58 mm. (0.062 in. to 0.141 in.) early cars 1,58 mm. to 3,17 mm. (0.062 in. to 0.125 in.) late cars
Diameter of steering wheel (all cars)	43,18 cm. (17.0 in.) prior to serial number 8222 40,64 cm. (16.0 in.) from serial number 8222 and onwards
Comiche	<b>with the exception of,</b> 38,10 cm. (15.0 in.) woodrim - from serial number 9770, limited period only, and 39,37 cm. (15.5 in.) from serial number 22583 and onwards
Turning circle (outside front) Wall to Wall	12,47 m. (L) 12,25 m. (R) [40 ft. 11 in. (L)] [40 ft. 2 in (R)]
Long Wheelbase	12,7 m. (L) 12,47 m. (R) [41 ft. 8 in. (L)] [40 ft. 11 in. (R)]
Kerb to Kerb	11,81 m. (L) 11,58 m. (R) [38 ft. 9 in. (L)] [38 ft. 0 in. (R)]
Long Wheelbase	12,03 m. (L) 11,81 m. (R) [39 ft. 6 in. (L)] [38 ft. 9 in. (R)]

### Rear wheels geometry

Camber (in degrees)	¼° negative ± ¼° early cars zero to -¼° late cars
Toe-in	Zero to 1,59 mm. (0.062 in.) early cars Zero to 12' (in degrees) late cars Both unsprung - non adjustable with car in show-room condition

### Dimensions

Wheelbase	3,05 m. (10 ft. 0¼ in.)
Track Cars prior to serial numbers SBH 5572, SRX 6752 and CRH 6760	1,46 m. (4 ft. 9½ in.) front and rear

Cars from serial numbers SBH 5572, SRX 6752 and CRH 6760	1,47 m. (4 ft. 9 $\frac{3}{4}$ in.) front and rear
Cars from serial number 18269	1,52 m. (5 ft.) front 1,51 m. (4 ft. 11 $\frac{1}{2}$ in.) rear
Road clearance (all cars)	16,5 cm. (6 $\frac{1}{2}$ in.)
Overall length	
Cars destined for countries other than U.S.A. and Canada	
Silver Shadow and Bentley T	5,196 m. (17 ft. 0 $\frac{3}{16}$ in.)
Long Wheelbase	5,298 m. (17 ft. 4 $\frac{3}{16}$ in.)
Corniche	5,196 m. (17 ft. 0 $\frac{3}{16}$ in.)
Cars destined for U.S.A. and Canada	
Silver Shadow and Bentley T	5,270 m. (17 ft. 3 $\frac{1}{2}$ in.)
Long Wheelbase	5,372 m. (17 ft. 7 $\frac{1}{2}$ in.)
Corniche	5,270 m. (17 ft. 3 $\frac{1}{2}$ in.)
Overall width	
Silver Shadow and Bentley T	1,827 m. (5 ft. 11 $\frac{13}{16}$ in.)
Long Wheelbase	1,827 m. (5 ft. 11 $\frac{13}{16}$ in.)
Corniche	1,836 m. (6 ft. 0 $\frac{5}{16}$ in.)
Overall height	
Silver Shadow and Bentley T	1,518 m. (4 ft. 11 $\frac{3}{4}$ in.)
Long Wheelbase	1,518 m. (4 ft. 11 $\frac{3}{4}$ in.)
Corniche Convertible	1,518 m. (4 ft. 11 $\frac{3}{4}$ in.)
Corniche Saloon	1,490 m. (4 ft. 10 $\frac{3}{4}$ in.)

**Battery (negative earth)**

Cars destined for countries other than U.S.A. and Canada	
Make and type	Chloride 369
Voltage	12V
Capacity	71 ampere hour at 20 hour rating
Cars destined for U.S.A. and Canada	
Make and type	Lucas Pacemaker CP 13/11
Voltage	12V
Capacity	68 ampere hour at 20 hour rating

## SECTION A2

### DATA

#### Identification of the two banks of the engine

Throughout this Manual, references are made to the 'A' and 'B' bank side of the engine. For easy identification, the two banks of the engine can be recognised as follows.

When viewing the engine from the driver's seat, the right-hand bank is 'A' bank and the left-hand bank is 'B' bank.

#### Air conditioning system

The air conditioning system (fitted as standard equipment from serial number 7500; offered as an option prior to 7500) provides unheated, heated or refrigerated air and is controlled by two switches on the centre console. Outlets are provided at the base of the windscreen, on the facia, under the facia and at the rear of the front seats. The air can be boosted in all these systems by two fan motors controlled from a five position switch on the centre console.

#### Automatic air conditioning system

Corniche cars from serial numbers:

Convertible	DRH 22583 (right-hand drive)
	DRX 22781 (left-hand drive)
Saloon	CRH 22648 (right-hand drive)
	CRX 22919 (left-hand drive)

Air temperature (blend) flaps form the basis of the automatic air conditioning system as they are operated by an electro-mechanical servo mechanism controlled by an electronic circuit. These circuits are fed with air temperature information from certain parts of the car and, acting on this information, drive the servos so that the air temperature (blend) flaps are moved into the correct positions to achieve the required in-car air temperature. The upper and lower systems operate independently, each system having its own set of air temperature sensors, air temperature selector, servo and servo electronics.

The system is operated by three switch controls situated on the facia.

The control marked AIR CONDITIONER has five positions and enables three automatic positions or a defrost position to be selected. The system can be switched off by turning the control to the OFF position.

The switch control marked UPPER TEMP controls the air temperature in the upper part of the car; the switch control marked LOWER TEMP controls the air temperature in the lower part of the car.

#### Automatic height control system

The system is a fully automatic hydraulic system and maintains the riding height of the car regardless of loading.

When the gear range selector lever is in any position except Neutral or Park the system is on slow levelling. When Neutral or Park is selected the system changes to fast levelling.

The system is operated by fluid, supplied under pressure from an engine driven pump and pressure accumulator and is controlled by one front and two rear height control valves and a front roll restrictor valve (cars prior to serial number 7404) or by two rear height control valves only (cars from serial number 7404 and onwards).

#### Automatic speed control system

Fitted as standard equipment on all cars from serial numbers.

Silver Shadow	SRH 17518
Long Wheelbase	LRH 16584, LRH 16609 and onwards
Corniche Convertible	DRH 16988
Corniche Saloon	CRH 16916

The automatic speed control system was fitted as standard equipment on all cars destined for U.S.A. and Canada from 1972. It was offered as an option from serial number 10325.

The controls for the automatic speed control system are either fitted to the end of the gear range selector

## **Chapter A**

lever or mounted in the moulding adjacent to the lower roll between the steering column and the centre console. The regulator and bellows servo are mounted in the engine compartment.

Any cruising speed over 48 k.p.h (30 m.p.h.) and up to 137 k.p.h. (85 m.p.h.) can be selected to give satisfactory operation of the automatic speed control system.

This system only operates when the vehicle is in top gear.

### **Body**

The car body is steel and is of a monocoque construction. The doors, luggage compartment lid and bonnet are made of light alloy, combining lightness with strength and rigidity. The under-frame and body shell are welded together.

### **Braking system**

Pressurised fluid is supplied from two camshaft driven pumps and two hydraulic accumulators. Power pressure is metered out to the brakes by two brake distribution valves actuated by brake pedal operation.

#### **Braking units**

Discs front and rear; two double cylinder calipers on each front wheel and one four cylinder caliper on each rear wheel.

#### **Service brake**

Three separate and independent hydraulic systems. Two are power brake systems and the third is a master cylinder system. Normally all the hydraulic circuits are in operation when the brake pedal is applied and the engine is running. The master cylinder system is fully operative irrespective of whether the engine is running or not.

#### **All power brakes - Cars from serial number 22118**

Two entirely independent hydraulic systems, each separately powered. Each system operates one of two individual disc brake caliper assemblies on each front wheel and one of two individual pairs of pistons and pads, housed in a single disc brake caliper assembly, on each rear wheel.

#### **Parking brake**

Separate mechanically controlled calipers are attached to service brake calipers at each rear wheel. Parking brake operation is by hand. On left-hand drive cars from serial number 16079 parking brake operation is by foot pedal application with a separate hand release.

## **Electrical system**

### **Alternator control**

The alternator control unit is located either in the engine compartment (early cars) or in the luggage compartment adjacent to the battery (late cars). It is a transistorised unit with a printed base circuit. It varies the alternator field current in order to maintain the stator output voltage within close limits. It is a sealed unit and cannot be adjusted.

### **Exterior lamps**

Four headlamps are fitted and operate whenever the main lighting switch is turned to the HEAD position. The headlamps contain either sealed beam units or bulbs dependent upon the car's domicile. The two inner lamps provide long range illumination. The two outer lamps provide short range 'flood' illumination. When switched to main beam all four headlamps are illuminated. The two inner lamps are extinguished when the headlamps are dipped.

A small warning lamp situated in the speedometer illuminates when the headlamps are switched to main beam.

Twin front fog lamps (if fitted) contain a single filament quartz halogen bulb. The fog lamps operate whenever the main lighting switch is turned to the FOG position.

Fog lamps are not fitted to cars destined for certain countries.

The side, tail, side marker, and rear number plate lamps illuminate whenever the main lighting switch is moved from the OFF position.

### **Interior lamps**

Interior roof lamps and floor illumination lamps are fitted and illuminate whenever the doors are opened. The roof lamps can also be operated with the appropriate switch.

The lamp mounted in the roof of the luggage compartment illuminates automatically whenever the luggage compartment lid is raised. Similarly, the bonnet lamp illuminates whenever the bonnet lid is raised.

A list of bulbs, headlamp bulbs and sealed beam units is shown in Chapter M.

### **Fuseboard**

The fuseboard is situated in the lower facia, to the side of the steering column. On Corniche cars (from serial number 22583) the fuseboard is in the lower facia, below the stowage compartment. Access is gained by unscrewing the knurled screw, or on Corniche cars anti-clockwise rotation of the two quick release clips, then lowering the panel.

**Windscreen washer**

The reservoir is located in the engine compartment.

Operation of the washer is controlled by pressing either the wipers control switch on the fascia, or the switch situated in the end of the direction indicator lever.

**Windscreen wipers**

Operation of the wipers is controlled by a switch on the fascia marked WIPE. The switch has two clockwise positions, the first position is for normal speed wiping, and the second increases the speed (early cars only).

On later cars the switch has two clockwise positions and one anti-clockwise position. The anti-clockwise position provides intermittent operation, giving one complete wipe every seven seconds (approximately).

**Engine****Lubrication system**

The engine oil from the sump is circulated by a gear type pump mounted on the front of the crankcase and driven by the crankshaft through skew gears.

High pressure oil is fed to the crankshaft, big-end bearings, camshaft bearings and timing gear, tappets, push rods and rocker ball end seatings. An intermittent feed supplies oil through the front cam-shaft bearing to the rocker shafts, rocker arms and valve tips. The connecting rod small-ends, gudgeon pins and cylinder walls are lubricated by a splash feed.

**Cooling system**

The engine cooling system comprises a matrix, a separate header (expansion) tank and a centrifugal pump. The pump is driven by the crankshaft through twin matched belts. The header tank is mounted separately above the radiator to reduce aeration in the system by separating the circulating coolant from the air space.

**Cooling system corrosion and freeze protection**

Prestone anti-freeze and summer coolant UT 184 or Prestone II winter/summer concentrate, 50% mixture with water giving frost protection down to a temperature of  $-36.5^{\circ}\text{C}$ . ( $-33.7^{\circ}\text{F}$ ).

**Coolant inhibitor**

Approved inhibitor SQ36. 89 c.c. (3 fluid ounces) of

the concentrate should be added to each 4.5 litres (1 Imperial gallon, 1.2 U.S. gallons) of water.

**Specific gravity of coolant**

The coolant should be checked for 50% anti-freeze/water mixture with a hydrometer. To give a 50% mixture at room temperature the specific gravity should be between 1.060 and 1.070.

**Emission control systems**

Refer to the appropriate section within Chapter U.

**Front and rear hubs**

The front hubs are mounted onto the yoke stub axle. The rear hubs are mounted onto hollow stub axles connected to the final drive unit by universal couplings and drive-shafts.

**Fuel filler door**

To open the filler door depress the button on the fascia. A manually operated release is situated in the luggage compartment.

**Power assisted steering**

Power assisted steering with collapsible steering column is fitted, the steering box is supplied with hydraulic fluid under pressure by an engine driven pump.

The steering idler box, fitted on the opposite side of the car to the steering box, incorporates an hydraulic damper; this damper gives protection against any violent reactions at the road wheels.

**Sub-frames**

The front sub-frame manufactured from welded sheet steel is either mounted on resilient metal mounts (early cars) or rubber mounts (late cars) to the car underframe.

The rear sub-frame manufactured from welded sheet steel is mounted to the car body underframe using resilient metal mounts.

**Suspension****Cars from serial number 12734 (Corniche) and 13485 (Silver Shadow and Bentley T)**

The front suspension is an independent coil spring arrangement with double acting hydraulic shock dampers, an anti-roll stabiliser and a transverse locating rod, all of which are attached to the front sub-frame.

The rear suspension is an independent coil

## **Chapter A**

spring arrangement with trailing arms and double acting hydraulic shock dampers; the trailing arms are pivoted on the rear sub-frame.

### **Cars prior to serial number 12734 (Corniche) and 13485 (Silver Shadow and Bentley T)**

The compliant front suspension is an independent coil spring arrangement with double acting hydraulic shock dampers, an anti-roll stabiliser bar and a compliance rod, all of which are attached to the front sub-frame.

The rear suspension is an independent coil spring arrangement with trailing arms, double acting hydraulic shock dampers and an anti-roll stabiliser bar; the trailing arms are pivoted on the rear sub-frame.

## **Transmission**

### **Final drive unit and drive-shafts**

The final drive unit is rigidly mounted on a cross-member which is attached to the body underframe by two rubber mounts. A torque arm flexibly mounted between the rear crossmember and the rear sub-frame absorbs the torque reaction at the crownwheel in the final drive unit.

The final drive unit casing contains hypoid bevel gears. Drive is transmitted to the rear wheels by two drive-shafts; the inner end of each shaft is connected by a ball and trunnion joint and the outer end by a universal coupling.

### **Propeller shaft**

The single piece propeller shaft incorporates resonance dampers. The shaft is connected to the torque converter transmission output shaft flange and to the final drive input flange by universal joints.

The propeller shaft assembly is dynamically balanced to fine limits.

### **Four speed automatic gearbox**

The four speed automatic gearbox transmits drive in four forward ranges and reverse. Gear changes are made automatically through a fluid coupling and three epicyclic gear trains. A parking lock is incorporated when reverse is selected and the ignition is switched off.

### **Torque converter transmission**

The torque converter transmission transmits the drive automatically in three forward ranges and reverse. Gear changes are made automatically and are obtained through a three element hydraulic torque

converter and a compound planetary gear train. A parking lock incorporated in the torque converter transmission operates when the gear range selector lever is moved to the Park position or when the ignition key is removed from the switchbox.



## SECTION A3

# HELI-COIL INSERTS

### Heli-coil inserts

Heli-coil inserts are used on various aluminium parts of the engine. They offer a far greater resistance to wear, stripping, seizing and corrosion than direct type threads.

Heli-coils have been used only where the parts are secured by setscrews, not where studs are fitted.

The Heli-coil inserts are made of stainless steel wire and can therefore be easily identified when fitted into their aluminium components.

#### Heli-coil insert - To remove (see Fig. A1)

1. Fit the blade of the Heli-coil insert extraction tool into the top of the threaded insert.
2. Press downwards onto the insert and then turn the blade anti-clockwise; the insert should then wind out of the hole.

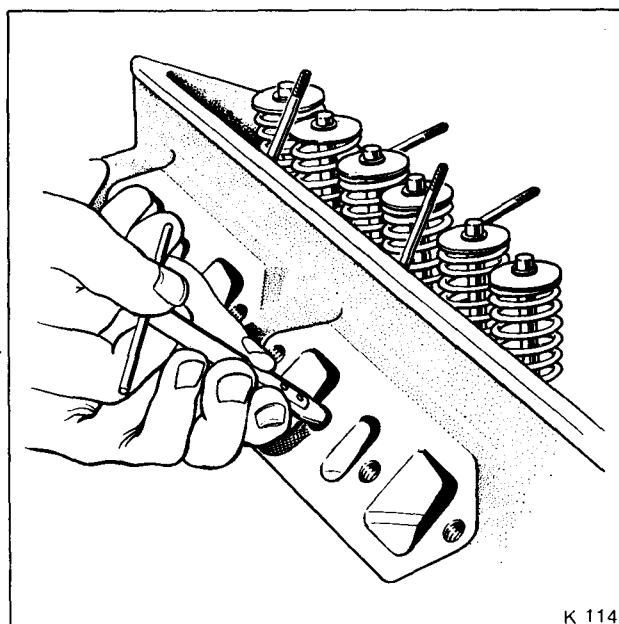


FIG. A1 HELI-COIL EXTRACTION TOOL

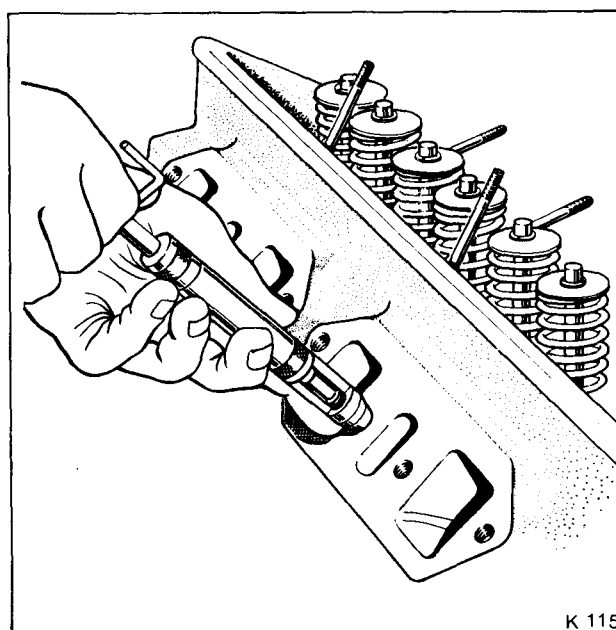


FIG. A2 HELI-COIL INSERTION TOOL

3. Examine the condition of the threads in the hole from which the Heli-coil was removed. If necessary rectify any damage by using a special Heli-coil insert tap.

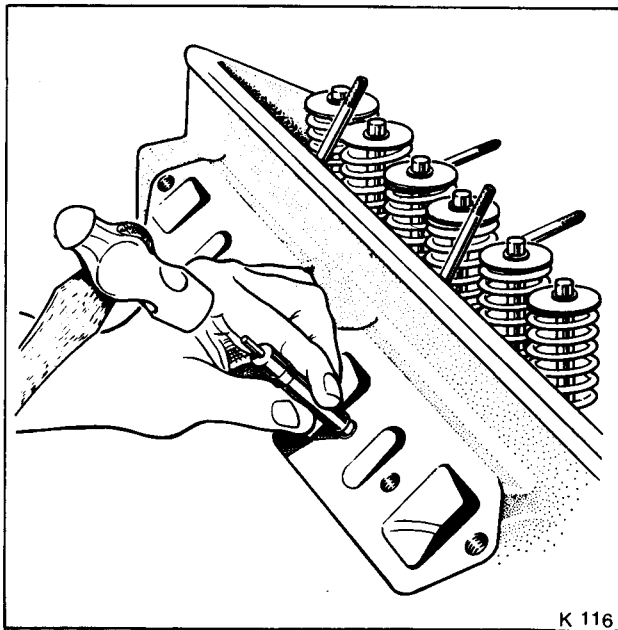
#### Heli-coil insert - To fit

As it is necessary to remove the tang from the end of the Heli-coil insert after fitting, it is important to ensure that the insert tang is notched.

Using the Heli-coil insertion tool shown in Figure A2 proceed as follows.

1. Withdraw the mandrel from the threaded nozzle and loading chamber.
2. Fit the insert into the chamber with the tang end positioned towards the nozzle.
3. Slide the mandrel through the insert and engage the tang into the slot.
4. Turn the handle clockwise, applying gentle pressure on the insert until it is located into the nozzle.

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**Fig. A3 HELI-COIL TANG 'BREAK-OFF' TOOL**

5. Continue turning until the first coil of the insert just emerges from the nozzle.
6. Fit the insertion tool over the tapped hole ensuring that it is square to the work face.
7. Commence winding until the insert is transferred from the nozzle to the tapped hole. Do not apply any pressure during this operation.
8. The Heli-coil insert is finally fitted when the coil is between  $\frac{1}{4}$  and  $\frac{1}{2}$  pitch below the surface of the work face.
9. Fit the special tang break off tool (punch) into the insert as shown in Figure A3.
10. Allow the innerpiece of the punch to slide downward to locate onto the tang.
11. Apply a sharp tap to the end of the punch so that the tang breaks off at the notch.
12. Ensure that the tang does not fall into any part of the engine etc. where it could cause damage.