VW Golf & Jetta Service and Repair Manual

I M Coomber and Christopher Rogers

Models covered *(1081 - 344 - 1AA11)*

VW Golf & Jetta Mk 2 models with petrol engines, including fuel injection, catalytic converter, Formel E, 16-valve and special/limited edition models 1043 cc, 1272 cc, 1595 cc & 1781 cc

Covers mechanical features of Van. Does not cover Convertible, Rallye, Caddy, diesel engine, 4 -wheel drive, Mk 1 models or new Golf range introduced in February 1992

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A book in the **Haynes Service and Repair Manual Series**

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ISBN **1 85960 282 7**

British Library Cataloguing in Publication Data
A catalogue record for this book is available from the British Library

Printed by **J H Haynes & Co. Ltd, Sparkford, Nr Yeovil, Somerset BA22 7JJ, England**

Haynes Publishing
Sparkford Nr Yeovil
Somerset BA22 7JJ England

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861 Lawrence Drive
Newbury Park
California 91320 USA

Editions Haynes S.A.
147/149, rue Saint Honoré, 75001 PARIS, France

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Engine oil level

Before you start

✔ Make sure that your car is on level ground.
✔ Check the oil level before the car is driven, or at least 5 minutes after the engine has been switched off.

HAYNES HiNT

If the oil is checked immediately after driving the vehicle, some of the oil will remain in the upper engine components, resulting in an inaccurate reading on the dipstick!

The correct oil

Modern engines place great demands on their oil. It is very important that the correct oil for your car is used (See "Lubricants, fluids and capacities").

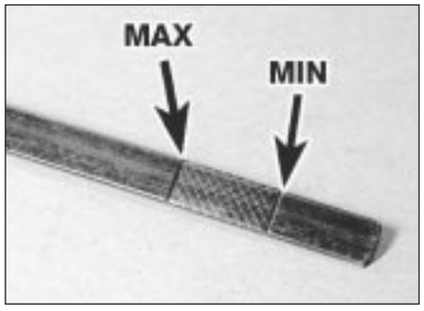
Car Care

● If you have to add oil frequently, you should check whether you have any oil leaks. Place some clean paper under the car overnight, and check for stains in the morning. If there are no leaks, the engine may be burning oil *(see "Fault Finding")*.

● Always maintain the level between the upper and lower dipstick marks (see photo 3). If the level is too low severe engine damage may occur. Oil seal failure may result if the engine is overfilled by adding too much oil.

1 The dipstick is located at the right-hand end of the engine (see "*Underbonnet check points*" on page 0•10 for exact location). Withdraw the dipstick.

2 Using a clean rag or paper towel remove all oil from the dipstick. Insert the clean dipstick into the tube as far as it will go, then withdraw it again.



3 Note the oil level on the end of the dipstick, which should be between the upper ("MAX") mark and lower ("MIN") mark. Approximately 1.0 litre of oil will raise the level from the lower mark to the upper mark.

4 Oil is added through the filler cap. Unscrew the cap and top-up the level; a funnel may help to reduce spillage. Add the oil slowly, checking the level on the dipstick often. Don't overfill (see "*Car Care" left*).

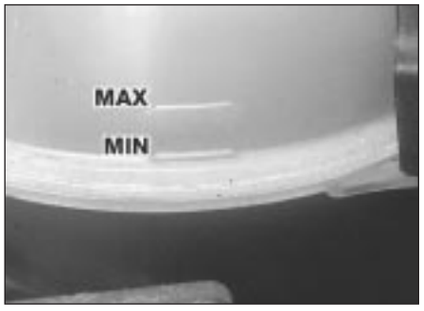
Coolant level

Warning: DO NOT attempt to remove the expansion tank pressure cap when the engine is hot, as there is a very great risk of scalding. Do not leave open containers of coolant about, as it is poisonous.

Car Care

● With a sealed-type cooling system, adding coolant should not be necessary on a regular basis. If frequent topping-up is required, it is likely there is a leak. Check the radiator, all hoses and joint faces for signs of staining or wetness, and rectify as necessary.

● It is important that antifreeze is used in the cooling system all year round, not just during the winter months. Don't top-up with water alone, as the antifreeze will become too diluted.



1 The coolant level varies with the temperature of the engine. When the engine is cold, the coolant level should be between the MAX and MIN marks on the side of the expansion tank. When the engine is hot, the level may rise slightly.

2 If topping up is necessary, **wait until the engine is cold**. Slowly unscrew the expansion tank cap, to release any pressure present in the cooling system, and remove it.

3 Add the recommended mixture of water and antifreeze through the expansion tank filler neck, until the coolant is up to the MAX level mark. Refit the cap, turning it clockwise as far as it will go until it is secure.

CO content (%)

1.05 litre carburettor engines:	
Pierburg/Solex 31 PIC-7	0.5 to 1.5
Pierburg/Solex 1B3 and Weber 32 TLA	1.5 to 2.5
1.3 litre carburettor engines (Pierburg/Solex 2E3)	1.5 to 2.5
1.6 litre carburettor engines:	
Pierburg/Solex 2E2 - engine code EZ	0.5 to 1.5
Pierburg/Solex 2E2 - engine code RF	1.0 to 1.5
1.8 litre carburettor engines (Pierburg/Solex 2E2)	0.5 to 1.5
K-Jetronic fuel-injected engine	0.5 to 1.5
Mono Jetronic fuel-injected engine	0.2 to 1.2
Digijet fuel-injected engine:	
Up to July 1989	0.3 to 1.1
July 1989	0.3 to 1.5
Digifant fuel-injected engine	0.5 to 1.5

Ignition system

Firing order (all engines)	1-3-4-2 (No. 1 cylinder at crankshaft pulley end)

Contact breaker system

	Type	Electrode gap
Spark plugs*:		
1.05, 1.3, 1.6 and 1.8 litre (pre July 1985)	Champion N7YCC or N7YC	0.8 mm or 0.7 mm

** Spark plug types and electrode gaps are recommended by Champion Spark Plug. If other types are used, refer to their manufacturer's recommendations*

HT lead type:	
1.05 litre	Champion LS-05 boxed set
1.3, 1.6 and 1.8 litre	Champion LS-07 boxed set
Distributor:	
Contact breaker gap (initial setting only)	0.4 mm
Dwell angle (1.05, 1.3 and 1.6 litre):	
Setting	44 to 50° (50 to 56%)
Wear limit	42 to 58° (47 to 64%)
Ignition timing (at idle):	
1.05 and 1.3 litre	4 to 6° BTDC
1.6 and 1.8 litre (carburettor engine)	17 to 19° BTDC
1.8 litre (fuel injection engine)	5 to 7° BTDC

Transistorised system

	Type	Electrode gap
Spark plugs*:		
pre Sept. 1985:		
1.05, 1.3, 1.6, 1.8 litre (pre July 1985)	Champion N7YCC or N7YC	0.8 mm or 0.7 mm
from Sept. 1985:		
1.3 litre	Champion N7BYC or N7YCC	0.8 mm
1.6 litre:		
Coil with green sticker	Champion N9BYC4 or N9YCC	1.0 mm
Coil with grey sticker	Champion N9YCC	0.8 mm
1.8 litre:		
Except 16V	Champion N7BYC or N7YCC	0.8 mm
16V	Champion C6BYC or C6YCC	0.8 mm

** Spark plug types and electrode gaps are recommended by Champion Spark Plug. If other types are used, refer to their manufacturer's recommendations*

HT lead type:	
1.05 litre.	Champion LS-05 boxed set
1.3, 1.6 and 1.8 litre.	Champion LS-07 boxed set
Distributor:	
Dwell angle (1.05,1.3 and 1.6 litre):	
Setting	44 to 50° (50 to 56%)
Wear limit	42 to 58° (47 to 64%)
Ignition timing:	
1.3 litre (code NZ) - TCI-H	4 to 6° BTDC at 750 to 850 rpm, with vacuum hose disconnected
1.6 litre (code RF) - TCI-H	17 to 19° BTDC at 700 to 800 rpm, with vacuum hose disconnected
1.8 litre:	
Code PB and PF - Digifant	5 to 7° BTDC at 2000 to 2500 rpm, with temperature sender disconnected
Code GU and RH - TCI-H	17 to 19° BTDC at 675 to 825 rpm, with vacuum hose connected
Code RP - TCI-H	5 to 7° BTDC at 950 rpm, with vacuum hose disconnected

Fully electronic system

All Specifications as for Transistorised System except for:

Ignition timing:	
1.8 litre 16 valve engine	5 to 7° BTDC at 950 to 1050 rpm, with vacuum hose connected

9 The engine will turn over more easily if the spark plugs are removed. Do not rotate the engine by turning the camshaft sprocket as this will stretch the timing belt. Use the alternator drivebelt (V-belt) or jack up one front wheel and with the engine in gear rotate the roadwheel. Do not turn the engine with any of the shims removed, otherwise the camshaft may foul the rim at the top of the bucket.

10 Repeat this measurement for all valves in turn and then compare the measurements with those specified ("Warm" clearance).

11 Make a table of the actual clearances and then calculate the error from those specified. Suppose on No 1 exhaust valve, the measured clearance is 0.15 mm. It is 0.3 mm too small so it must be adjusted and a shim 0.3 mm thinner fitted instead of the present one. As the shims are in steps of 0.05 mm variation, the required shim can be selected once the size of the shim at present installed is known. If you have dismantled and reassembled the head, then you know the size etched on the back of the shim but if you do not, then the shim must be removed to find out.

12 With the cam turned to give maximum clearance, the tappet is pushed down against the valve springs while the shim is levered out and removed by the VW tool or a screwdriver. Be careful, because if the spanner slips when the shim is halfway out, the shim will fly out sharply **(see illustration)**.

13 Once all the shim sizes are known, a table may be constructed and the sizes of the new shims required may be calculated. Going back to the example, if the present shim is marked 3.60 then one marked 3.30 is required. Bucket shims are available in 26 different thicknesses which increase in increments of 0.05 mm, from 3.00 mm to 4.25 mm.

12.12 Removing a tappet bucket shim - 1.6 and 1.8 litre

14 As it is unlikely that you will have the required shims readily available, it will be necessary to wait until they have been obtained before the tappets can be adjusted.

15 When inserting the shims, the thickness etching faces should be facing downwards.

16 Once the correct clearances have been achieved, refit the spark plugs and the valve cover.

13 Alternator, power steering pump and air conditioner compressor drivebelt(s) check

1 Check all drivebelts along their full length for cracks, splitting, fraying or damage. Check also for signs of glazing (shiny patches) and for separation of the belt plies. Renew the belt if worn or damaged.

> **HAYNES HiNT** ***Always recheck the tension of a new drivebelt after the engine has been run for ten minutes.***

Alternator

Pre 1985

2 Depress the alternator drivebelt firmly with a finger midway between the alternator and crankshaft pulleys **(see illustration)**. The belt should deflect approximately 5.0 mm.

3 If a new drivebelt has been fitted, then initial adjustment should give a deflection of 2.0 mm. After a suitable running in period of about 500 miles (750 km), belt adjustment should be rechecked and adjusted to deflect 5.0 mm.

4 To adjust the drivebelt, loosen the nut on the adjusting link and pivot bolt **(see illustrations)**, then lever the alternator away from the cylinder block by using a lever at the pulley end of the alternator, until the belt is tensioned correctly.

5 Tighten the nut and bolt on completion of drivebelt adjustment.

From 1985

6 From early 1985, some models are fitted with a rack type alternator adjustment link **(see illustration)**. To adjust drivebelt tension, first fully loosen the adjustment locknut and bolt, the link pivot bolt and the alternator pivot bolt, so that the alternator falls to one side under its own weight.

7 Using a socket and torque wrench on the adjustment bolt, apply a torque of 8 to 10 Nm (6 to 7 lbf ft), then secure the adjustment bolt in the set position by tightening its locknut to 35 Nm (26 lbf ft).

8 If the special VW tool is being used, then the adjustment bolt can now be tightened. If not, tighten the pivot bolt then remove the socket and immediately tighten the adjustment bolt, making sure that the alternator does not move.

9 Tighten the link pivot bolt and alternator pivot bolt.

Power steering pump

10 Loosen the power steering pump unit retaining nuts and bolts and the adjuster bolt locknut on the pump bracket.

11 Turn the tensioning bolt until the belt can be depressed approximately 10.0 mm under firm finger pressure midway between the crankshaft and pump pulleys.

12 When tension is correct, tighten the adjusting bolt locknut and the pump retaining nuts and bolts.

Air conditioner compressor

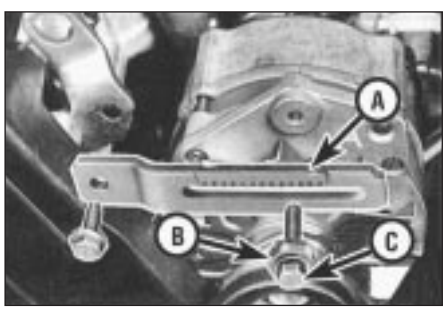
13 Drivebelt tension is adjusted by adding or subtracting shims from between the halves of the compressor pulley.

14 When correctly adjusted, the belt should give a deflection of 5 to 10 mm on its longest run.

13.2 Checking alternator drivebelt tension

13.4a Alternator drivebelt tensioner link - 1.3 litre

13.4b Alternator drivebelt tensioner link - 1.8 litre



13.6 Rack type alternator drivebelt tensioner link (A) locknut (B) and adjustment bolt (C)

Chapter 2 Part A:
Engine repair procedures - 1.05 and 1.3 litre pre August 1985

Contents

Degrees of difficulty

Easy, suitable for novice with little experience 

Fairly easy, suitable for beginner with some experience 

Fairly difficult, suitable for competent DIY mechanic 

Difficult, suitable for experienced DIY mechanic 

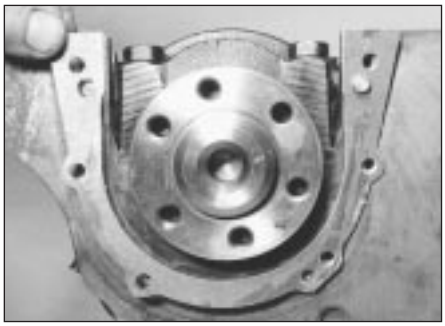
Very difficult, suitable for expert DIY or professional 

Specifications

General

Type	Four-cylinder in-line, water cooled, overhead camshaft
Code:	
1.05 litre	GN
1.3 litre	HK
Firing order	1-3-4-2 (No 1 at camshaft sprocket end)
Displacement:	
1.05 litre	1043 cc
1.3 litre	1272 cc
Bore:	
1.05 litre	75.0 mm
1.3 litre	75.0 mm
Stroke:	
1.05 litre	59.0 mm
1.3 litre	72.0 mm
Compression ratio:	
1.05 litre	9.5 to 1
1.3 litre	9.5 to 1
Compression pressure:	
New	8 to 10 bar
Minimum	7.0 bar
Maximum permissible difference between any two cylinders	3.0 bar

14.13a Withdrawing crankshaft rear oil seal housing . . .



14.13b . . . and gasket

14.14 Remove crankshaft rear oil seal from housing

14 Support the housing and drive out the oil seal **(see illustration)**.
15 Clean the recess in the housing.
16 Smear a little clean engine oil on the lip and outer edge of the new seal then tap it into the housing using a block of wood **(see illustration)**.
17 Clean the mating faces then refit the housing, together with a new gasket, and tighten the bolts evenly in diagonal sequence.
18 Refit the sump and flywheel.

15 Sump - removal

1 If the engine is still in the vehicle, first carry out the following operations:

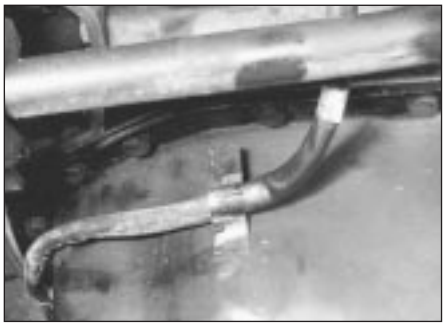
a) Jack up the front of the vehicle and support it on axle stands (see "Jacking and vehicle support"). Apply the handbrake
b) Disconnect the right-hand side driveshaft and the exhaust system
*c) Unclip the alternator wire from the sump **(see illustration)***
d) Drain the engine oil into a suitable container. Clean the drain plug and washer and refit it, tightening to the specified torque

2 Unscrew the bolts and withdraw the sump from the cylinder block **(see illustration)**. If it is stuck, lever it away or cut through the gasket with a knife .
3 Scrape the gasket from the sump and cylinder block.

16 Oil pump - removal

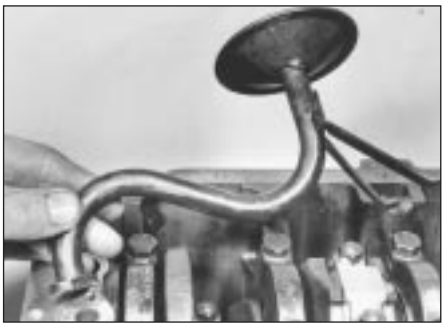
1 Remove the timing belt and crankshaft sprocket.
2 Remove the sump.
3 Unbolt and remove the pick-up tube and strainer from the oil pump and cylinder block. Remove the flange gasket **(see illustration)**.
4 Unscrew the bolts and withdraw the oil pump from the dowels on the front of the cylinder block. Note that the timing pointed bracket is located on the two upper central bolts and the timing belt guard on the two left-hand side bolts. Remove the gasket **(see illustrations)**.

14.16 Installing new crankshaft rear oil seal



15.1 Alternator wire clip on sump

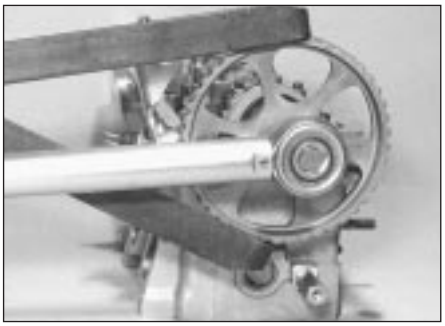
15.2 Removing the sump



16.3 Removing oil pump pick-up tube and strainer

16.4a Removing oil pump . . .

16.4b . . . and gasket



4.5 Two lengths of metal used to lock camshaft sprocket

4 Camshaft - removal

1 Unscrew the nuts and bolts from the valve cover and remove the cover together with the gasket and reinforcement strips.
2 Turn the engine until the indentation in the camshaft sprocket appears in the TDC hole in the timing cover and the notch in the crankshaft pulley is aligned with the TDC pointer on the front of the oil pump. Now turn the crankshaft one quarter of a turn anti-clockwise so that none of the pistons are at TDC.
3 Unbolt and remove the timing cover, noting that the dipstick tube and earth lead are fitted to the upper bolts. On some later 1.3 litre models, it is necessary to remove the crankshaft pulley to remove the lower timing belt cover.
4 Loosen the coolant pump retaining bolts, then turn the pump body clockwise to release the tension from the timing belt. Remove the timing belt from the camshaft sprocket.
5 Devise a method to prevent the camshaft turning and remove the sprocket bolt **(see illustration)**. Remove the camshaft sprocket and where applicable, the Woodruff key.
6 The camshaft bearing caps must be refitted in their original locations and the same way round. They are usually numbered but mark them if necessary, to ensure correct refitting.
7 Remove bearing caps Nos 5, 1 and 3, in that order. Now undo the nuts holding 2 and 4 in a diagonal pattern and the camshaft will lift them up as the pressure of the valve springs is exerted. When they are free, lift the caps off.
8 If the caps are stuck, give them a sharp tap with a soft-faced mallet to loosen them. Do not try to lever them off with a screwdriver.
9 Lift out the camshaft complete with the oil seal.

5 Cylinder head - dismantling and overhaul

Caution: If new tappets are fitted, the engine must not be started after fitting for approximately 30 minutes, or the valves will strike the pistons.

Cylinder head

1 If the valve seats are badly pitted or eroded they can be reworked but this is a specialist job best left to a VW dealer or engine overhaul specialist.
2 Similarly, if the head is warped, its surfaces can be skimmed, again by specialist engineers.
3 If it is found that there are cracks from the valve seats or valve seat inserts to the spark plug threads, the cylinder head may still be serviceable. Consult your VW dealer for advice.

Hydraulic bucket tappets

4 With the camshaft removed, lift out the tappets one by one, ensuring that they are kept in their correct order and can be returned to their original bores **(see illustration)**.
5 Place them, cam contact surface down, on a clean sheet of paper as they are removed.
6 Inspect the tappets for wear (indicated by ridging on the clean surface), pitting and cracks.
7 Tappets cannot be repaired and if worn, must be renewed.
8 Before fitting the tappets, lubricate all parts liberally with clean engine oil and slip each tappet back into its original bore.

Valves

9 With the camshaft and tappets removed, use a valve spring compressor with a deep reach to compress the valve springs. Remove the two cotters and release the compressor and springs.
10 Lift out the upper spring seat **(see illustration)**.
11 Remove the outer and inner valve springs **(see illustrations)**.
12 Lift out the valve **(see illustration)**.
13 The valves should be inspected as described in Part A of this Chapter, Section 11.
14 Valves must be renewed if they are worn and be ground in the normal manner.
15 If possible, check the valve spring lengths against new ones. Renew the whole set if any are too short.
16 Refitting is a reversal of removal.

Valve stem oil seals

17 The valve stem oil seals should be renewed whenever the valves are removed, by prising them from the ends of the valve guides **(see illustration)**.

5.4 Removing an hydraulic bucket tappet

5.10 Removing valve spring upper seat

5.11a Removing an outer valve spring

5.11b Removing an inner valve spring

5.12 Removing a valve

Cylinder head bolts (engine cold)	As for 1.05 and 1.3 litre engines	
Refer to illustration 5.25b. Also 40.1a and 40.1b in Part A of this Chapter.		
a) M8	25	18
a) M10	45	33
b)	35	26
c)	45	33
d)	50	37
e)	60	44
f)	70	52
g)	80	59

** When checking the connecting rod-to-crankshaft journal radial clearance using Plastigage, tighten only to 30Nm (22 lbf ft).*

1 General information

The 1.6 and 1.8 litre 8-valve engines are of four-cylinder, in-line, overhead camshaft design, mounted transversely at the front of the vehicle. The transmission is attached to the flywheel end of the engine.

The crankshaft is of five main bearing type, its endfloat being controlled by a shouldered centre bearing or by half thrustwashers located each side of the centre bearing.

The camshaft is driven by a toothed belt which is tensioned by a tensioner on an eccentric bearing. On engines manufactured before August 1985, the valves are operated by bucket type cam followers in direct contact with the camshaft. From August 1985, all engines are fitted with a redesigned cylinder head incorporating hydraulic bucket tappets in place of the previous shim bucket tappets. Camshaft bearing No. 4 is deleted on all single camshaft engines. In order to identify the type of tappets fitted, a sticker is normally affixed to the valve cover indicating that valve clearance adjustment is neither necessary nor possible.

An intermediate shaft (driven by the toothed timing belt) drives the distributor and oil pump and on carburettor equipped engines, the fuel pump.

The oil pump is of twin gear type, driven from the immediate shaft and incorporates a pressure relief valve.

The aluminium cylinder head is of conventional design with the inlet and exhaust manifolds mounted on the rear side (as viewed with the engine in the vehicle).

The crankcase ventilation system comprises a hose from the flywheel end of the valve cover to the side of the air cleaner.

On fuel injection equipped engines, there is a hose to the air inlet manifold and a hose to the air cleaner from a three-way connector on the valve cover.

2 Major operations possible with engine in vehicle

The following operations can be carried out without having to remove the engine from the vehicle:

a) Removal and servicing of the cylinder head, camshaft and timing belt
b) Renewal of the crankshaft rear oil seal (after removal of the transmission, driveplate or clutch as applicable)
c) Removal of the sump and oil pump
d) Removal of the piston/connecting rod assemblies (after removal of the cylinder head and sump)
e) Renewal of the crankshaft front oil seal, intermediate shaft front oil seal and camshaft front oil seal
f) Renewal of the engine mountings

3 Major operations only possible after removal of engine from vehicle

The following operations can only be carried out after removal of the engine from the vehicle:

a) Renewal of crankshaft main bearings
b) Removal and refitting of the crankshaft
c) Removal and refitting of the intermediate shaft

4 Method of engine removal

1 The engine, together with the gearbox, must be lifted from the engine compartment, then the engine separated from the gearbox on the bench. Two people will be needed.

2 A hoist of 150 kg capacity will be needed to lift the engine approximately 1 metre. If the hoist is not portable and the engine is lifted, then sufficient room must be left behind the vehicle to push it back out of the way so that the engine may be lowered. Blocks will be needed to support the engine after removal .

3 Ideally, the vehicle should be over a pit. If this is not possible then the body must be supported on axle stands (see "*Jacking and vehicle support*") so that the front wheels may be turned to undo the driveshaft nuts. The left-hand shaft is accessible from above but the right-hand shaft must be undone from underneath. Removal of the gearshift linkage can only be done from underneath, as can exhaust downpipe-to-manifold detachment.

4 The exhaust downpipe-to-manifold flange connection is secured by special spring clips rather than bolts or studs and nuts. When disconnecting and reconnecting the joint, it will be necessary to use VW tool no. 3049A. Without this tool, detachment and certainly reconnection of the joint and clips is virtually impossible, so make arrangements to borrow or hire the tool in advance.

5 The only other special tools required will be a set of splined key wrenches which will be needed to remove and refit the socket-head bolts used to secure certain items such as the cylinder head bolts.

6 Draining of oil and coolant is best done away from the working area if possible. This saves the mess made by spilled oil in the place where you must work.

7 Although not listed as an optional fitting on UK models, an air conditioning system may have been fitted. Where this is the case, the following precautions must be taken when handling refrigerant lines or system components:

a) Do not stress or bend flexible hose lines to a radius of less than 101 mm
b) Flexible hose lines must be correctly located, must not chafe against adjacent components and must be kept well clear of the exhaust manifold and downpipe
c) All metal tubing lines must be kept free of kinks and must be handled with care
d) Do not disconnect any of the air conditioning supply lines
e) Do not weld or apply heat in the vicinity of the air conditioning lines or equipment
f) If any part of the system is to be detached then it must first be depressurised by your VW dealer or a competent air conditioning systems engineer. The only exception is the removal and fitting of the compressor drivebelt which can be achieved in the same manner as for the alternator drivebelt

5 **Engine** - removal

Carburettor equipped

1 Disconnect the battery negative lead.
2 Remove the bonnet.
3 Drain the engine coolant.
4 Position a suitable container beneath the engine, undo the sump drain plug and drain the engine oil - see Chapter 1. On completion clean the drain plug and refit it. Renew the O-ring.

17 Oil filter - renewal

Refer to Chapter 1, Section 18

18 Oil cooler - removal and refitting

1 On fuel injection models, an oil cooler is fitted between the oil filter cartridge and mounting bracket. The cooler must be renewed if the engine oil has been contaminated with metal particles, such as might be the case following total or partial engine seizure. Renew it anyway if it is likely to contain any other harmful contaminant.
2 To remove the cooler, first remove the oil filter cartridge.
3 Drain the cooling system and disconnect the coolant hoses from the cooler.
4 Remove the cooler retaining nut and the cooler. The O-ring between the cooler and mounting must be renewed.
5 Refitting is a reversal of the removal procedure. Wipe clean the sealing faces of the cooler and mounting and smear the O-ring with clean engine oil.
6 On completion, top-up the engine oil and coolant levels. Start the engine and check for any signs of leaks.

19 Oil filter mounting - removal and refitting

1 Remove the oil filter and on fuel injection models, the oil cooler.
2 Disconnect the oil pressure switch lead, undo the oil filter mounting securing bolts and withdraw the mounting and gasket.
3 The oil pressure switch can be unscrewed from the top face of the mounting if required. Renew the switch O-ring.
4 Refitting is a reversal of the removal procedure. Renew the mounting gasket.

20 Oil seals - renewal

Note: *The following procedures were all carried out with the engine in the vehicle*

Crankshaft seals

Flywheel/driveplate end

1 On manual gearbox models, remove the clutch and pressure plate. On automatic transmission models, remove the transmission then unbolt the driveplate from the crankshaft, noting the location of the spacer and shim(s).
2 Carefully prise out the oil seal with a screwdriver or strong wire and wipe clean the recess **(see illustration)**.
3 Fill the space between the lips of the new seal with multi-purpose grease, then drive it squarely into the housing using a block of wood or suitable metal tubing. If at all possible, use VW fitting sleeve No. 2003 to avoid damage to the oil seal lip.
4 Refit the driveplate or clutch.

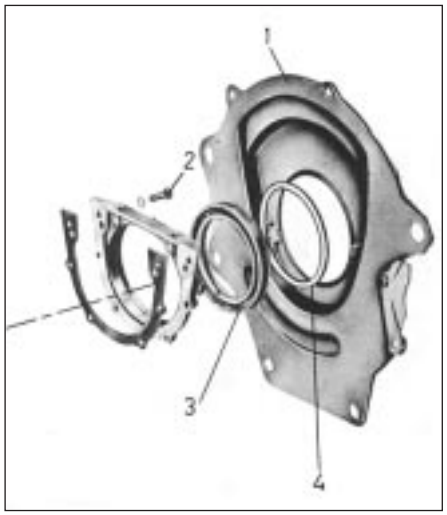
Timing belt end

5 Remove the alternator, together with its drivebelt.
6 Remove the timing belt cover and timing belt, ensuring that the timing marks are correctly aligned.
7 Unscrew the bolt from the front of the crankshaft, withdraw the pulley and sprocket and remove the Woodruff key. On manual gearbox models, if the belt is difficult to loosen, have an assistant engage top gear and apply the brakes. On automatic transmission models, remove the starter model and restrain the driveplate ring gear with a suitable lever.
8 Prise out the oil seal or extract it with VW tool No. 2085, then wipe clean the recess **(see illustration)**.
9 Fill the space between the lips of the new seal with multi-purpose grease, then drive it squarely into the housing using a block of wood or suitable metal tubing. If available use VW fitting sleeve No. 3083.
10 The remaining refitting procedure is a reversal of removal. Ensure that the timing marks are aligned before refitting the timing belt and tensioning it.

Camshaft front seal

11 Remove the alternator together with its drivebelt.
12 Remove the timing belt cover and timing belt, ensuring that the timing marks are correctly aligned.
13 Hold the camshaft sprocket stationary with a screwdriver inserted through one of its holes, then unscrew the bolt and remove the washer, sprocket and Woodruff key.
14 Prise out the oil seal or alternatively, extract it with VW tool No. 2085, then wipe clean the recess.
15 Fill the space between the lips of the new seal with multi-purpose grease, then drive it squarely into the cylinder head using a block of wood or suitable metal tubing. If available, use VW fitting sleeve No. 10-203.
16 The remaining refitting procedure is a reversal of removal. Ensure that the timing marks are aligned before refitting the timing belt and tensioning it.

20.8 VW tool 2085 for removing crankshaft oil seal (timing belt end) and camshaft oil seal



20.2 Flywheel end crankshaft oil seal components

1 Intermediate plate
2 Bolt
3 Oil seal
4 Sealing ring (not fitted to all models)

Intermediate shaft seal

17 Remove the alternator together with its drivebelt.
18 Remove the timing belt cover and timing belt, ensuring that the timing marks are correctly aligned.
19 Hold the intermediate shaft sprocket stationary with a screwdriver inserted through one of its holes, then unscrew the bolt and remove the washer, sprocket and Woodruff key.
20 Renew the oil seal.
21 The remaining refitting procedure is a reversal of removal. Ensure that the timing marks are aligned before refitting the timing belt and tensioning it.

21 Examination and renovation - general information

Refer to Section 20 in Part A of this Chapter.

22 Crankshaft and bearings - examination and renovation

Refer to Section 21 in Part A of this Chapter.

Chapter 3
Cooling, heating and air conditioning systems

Contents

Degrees of difficulty

Easy, suitable for novice with little experience 

Fairly easy, suitable for beginner with some experience 

Fairly difficult, suitable for competent DIY mechanic 

Difficult, suitable for experienced DIY mechanic 

Very difficult, suitable for expert DIY or professional 

Specifications

Cooling system

Type	Pressurised with pump driven by timing or V-belt. Front mounted radiator with internal or external expansion tank. Electric cooling fan

Radiator/expansion tank

Cap operating pressure	1.2 to 1.5 bar

Thermostat

Minimum stroke	7.0 mm
Opening temperature:	
1.05 and 1.3 litre engines:	
Rocker finger tappet type	92°C
Hydraulic tappet type	87°C
1.6 and 1.8 litre engines	85°C
Fully open temperature:	
1.05 and 1.3 litre engines:	
Rocker finger tappet type	108°C
Hydraulic tappet type	102°C
1.6 and 1.8 litre engines	105°C

Cooling fan thermo-switch

Carburettor engines:	
Switch-on temperature	93° to 98°C
Switch-off temperature	88° to 93°C
Fuel injection engines (except 16 valve):	
Switch-on temperature:	
Single speed and 1st stage of twin speed	92° to 97°C
2nd stage of twin speed	99° to 105°C
Switch-off temperature:	
Single speed and 1st stage of twin speed	84° to 91°C
2nd stage of twin speed	91° to 98°C
Injector cooling:	
Switch-on temperature	110°C
Switch-off temperature	103°C

11 Air conditioning system compressor - removal and refitting

Warning: The air conditioning system must be depressurised and drained by a VW dealer or refrigeration specialist. Do not attempt this yourself.

1 Removal and refitting of the air conditioner compressor is straight-forward. However, under no circumstances should the refrigerant circuit be opened **(see illustration)**.

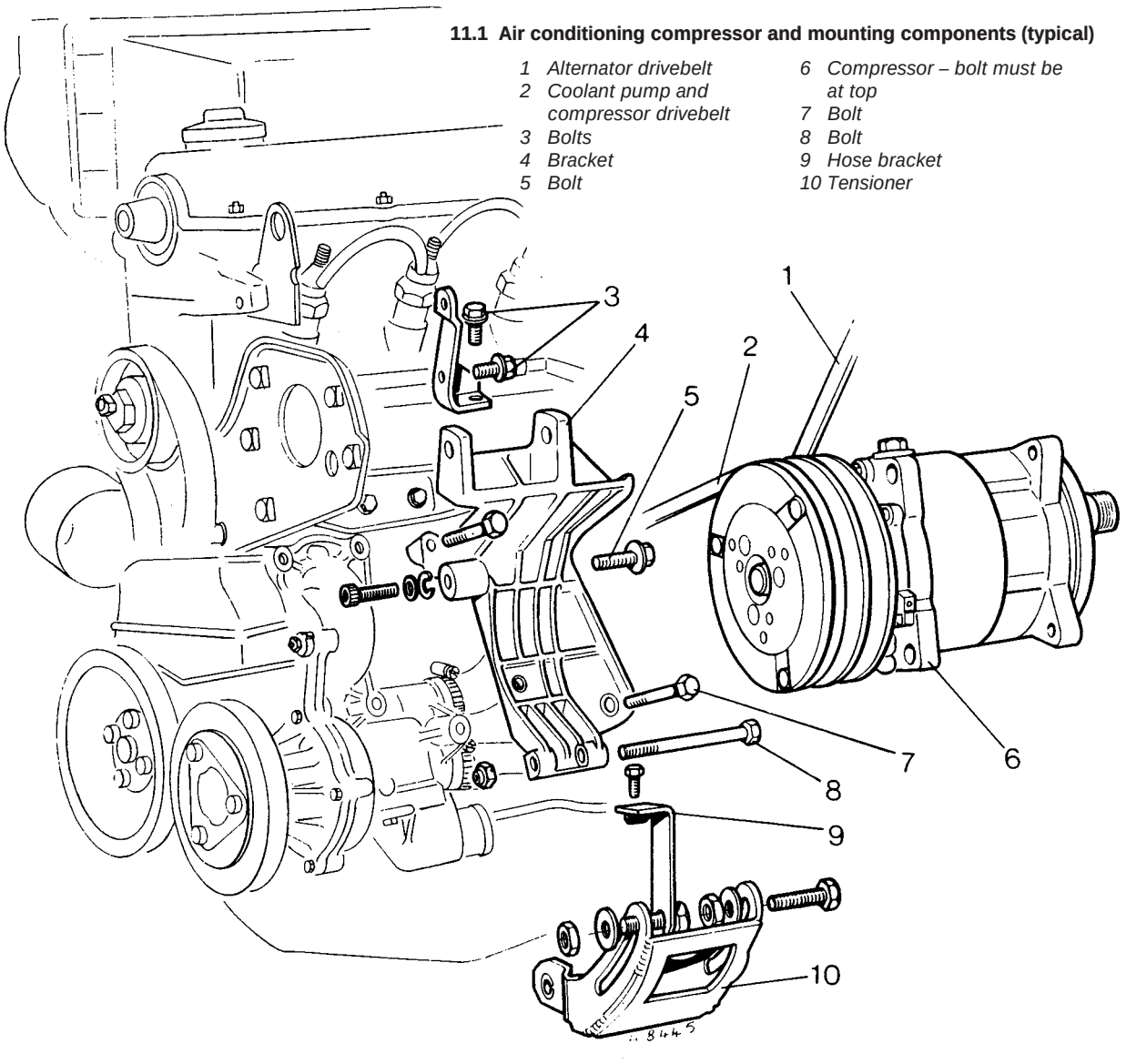
2 Place the compressor on the side of the engine compartment when removing the engine and only move it to the point where the flexible refrigerant hoses are in no danger of being stretched.

3 When a situation arises which calls for the removal of one of the air conditioning system components, have the system discharged by your VW agent or a qualified refrigeration engineer. Similarly have the system recharged by him on completion.

4 Observe the precautions at the start of this Chapter.

12 Air conditioning system compressor - drivebelt adjustment

Refer to Chapter 1, Section 13.



11.1 Air conditioning compressor and mounting components (typical)

1 Alternator drivebelt
2 Coolant pump and compressor drivebelt
3 Bolts
4 Bracket
5 Bolt
6 Compressor – bolt must be at top
7 Bolt
8 Bolt
9 Hose bracket
10 Tensioner

retaining clip and then disconnect the cable from the carburettor.
17 At the transmission end, prise free the securing clip and detach the cable from the operating lever and the cable support bracket.

Refitting

18 Refitting of both cables is a reversal of the removal procedure.

Adjustment

19 This procedure is described in Chapter 7B.

11 Accelerator pedal - removal and refitting

Removal

1 Remove the lower facia panel.
2 Disconnect the accelerator cable from the pedal
3 Prise out the clip and remove the pivot pin.
4 Remove the accelerator pedal. If necessary press out the pivot pin bushes.

Refitting

5 Refitting is a reversal of removal. Lubricate the bushes with a little grease and check cable adjustment.

12 Choke cable (1.05 litre engine) - removal, refitting and adjustment

Removal

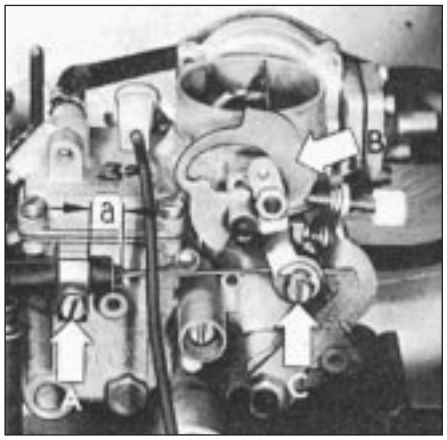
1 Disconnect the battery negative lead.
2 Remove the air cleaner.
3 Using a screwdriver, loosen the inner and outer cable clamps and disconnect the cable from the carburettor.
4 Working inside the vehicle, remove the lower facia panel.
5 Pull out the clip and remove the choke knob.
6 Unscrew the ring and withdraw the cable from the facia.
7 Disconnect the wiring and withdraw the complete cable from inside the vehicle.

Refitting

8 Refitting is a reversal of removal. Make sure that the cable is correctly aligned and that the grommets are firmly fitted in the bulkhead. Adjust it as follows before refitting the air cleaner.

Adjustment

9 Locate the outer cable in the clamp so that its end protrudes by approximately 12.0 mm. Tighten the clamp with the outer cable in this position **(see illustration)**.



12.9 Choke cable adjustment setting – 1.05 litre

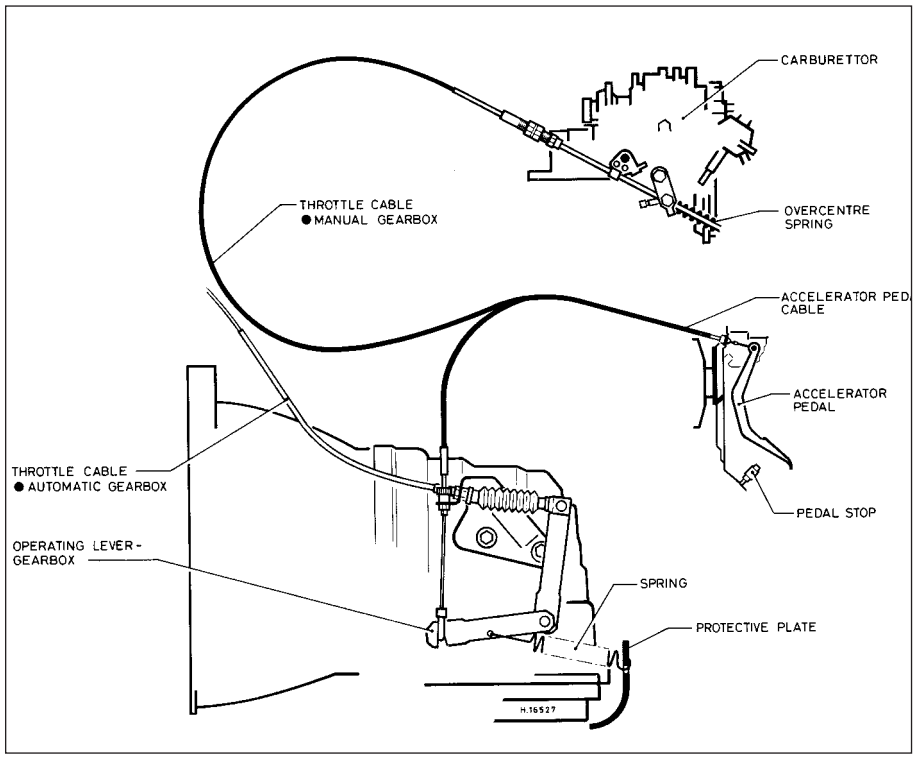
A Outer cable projection
B Cam and stop
C Choke inner cable connection

10 Push the choke knob fully in then pull it out by 3.0 mm. Switch on the ignition and check that the warning lamp is not lit.
11 Insert the inner cable into the choke lever clamp and fully open the choke lever by hand. Tighten the inner cable clamp screw in this position.
12 Refit the air cleaner.

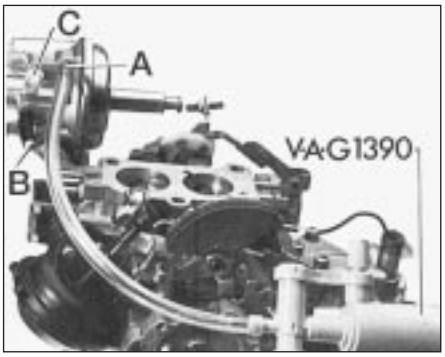
13 Carburettor - removal and refitting

Removal

1 Disconnect the battery earth lead.
2 Remove the air cleaner unit.
3 Disconnect the accelerator cable from the carburettor.
4 Disconnect the wiring from the following, as applicable:
a) Fuel cut-off solenoid
b) Bypass air cut-off valve
c) Part throttle channel heater
d) Automatic choke control unit
e) Earth point
5 Drain off half the engine coolant then disconnect the coolant hoses from the automatic choke unit and the expansion element (where applicable) **(see illustrations)**.
6 Disconnect the fuel supply and return hoses at the carburettor/fuel reservoir, as necessary, and plug or clamp the hoses to prevent fuel leakage. Note the connections in case of confusion when refitting.
7 Disconnect the vacuum hoses and note their connections.
8 Unscrew the through-bolts or retaining nuts, as applicable, and carefully remove the carburettor from the inlet manifold **(see illustration)**.
9 To remove the intermediate flange from the manifold, undo the four nuts on the manifold underside and lift the flange clear.



10.13 Accelerator/throttle cable connections – manual gearbox and automatic transmission variants with 2E2 carburettor



17.10 Accelerator pump check preparation

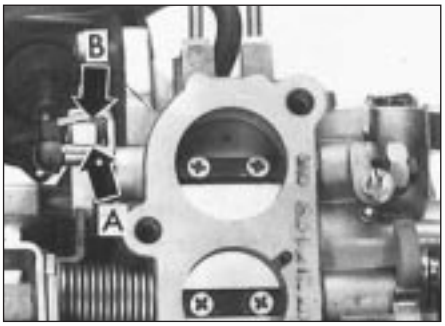
A Vacuum pump connection
B Plug vacuum connection (3-point unit)
C Plug vacuum connection (4-point unit)

Accelerator pump

9 To make this check, the carburettor must be removed and you will need a vacuum pump and an M8 x 20 mm bolt.

10 Detach the vacuum hoses from the three/four point unit then connect up the vacuum pump to the three/four point unit at "A" **(see illustration)**. Plug connection B (and C on four point unit). Apply vacuum with the pump to hold the diaphragm pushrod in the overrun/cut-off position and to give a clearance between the fast idle speed and diaphragm pushrod.

17.13 Loosen screw (A) and turn cam plate (B) in direction required to adjust accelerator pump injection capacity



17.15 Lock lever clearance with throttle valves closed

11 Pivot the warm-up lever up to the point where the throttle valve control pin has clearance and insert the M8 x 20 mm bolt to hold the warm-up lever in this position **(see illustration)**.

12 Hold the carburettor over a funnel and measuring glass then slowly open the throttle valve lever fully five times allowing at least 3 seconds per stroke. Divide the total quantity by five and check the resultant injection capacity against that specified.

13 If adjustment is necessary, loosen screw A and rotate the cam plate B in the required direction to increase or decrease the injection capacity **(see illustration)**. On completion, retighten the screw and seal in position with locking compound.

14 The accelerator pump injection capacity can also be checked with the carburettor in the vehicle but as specialised equipment is required, this is a task best entrusted to your VW dealer.

Throttle valve

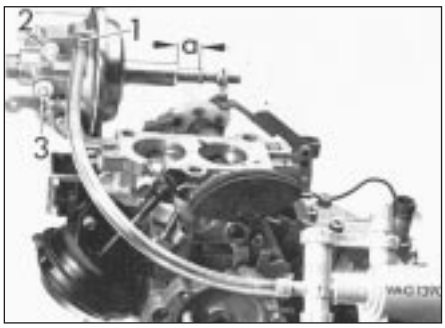
15 For the basic Stage II valve adjustment, proceed as described in Section 16, paragraphs 6 and 7 whilst referring to the accompanying illustration **(see illustration)**.

Three/four point unit - vacuum pump method

16 Detach the vacuum hoses from the unit and attach a vacuum pump to connection "1" **(see illustration)**. Apply vacuum to pull the diaphragm pushrod to the idle point and then measure the amount of rod protrusion, which must be as specified.

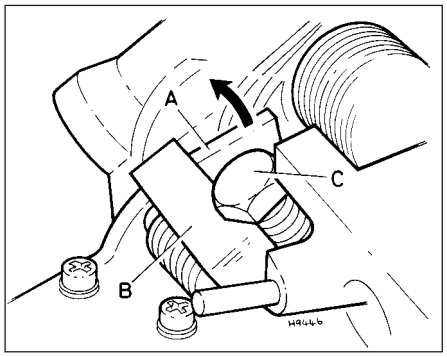
17 To check the overrun cut-off point, plug off the vacuum connection 3, then apply increased vacuum with the vacuum pump. This should cause the diaphragm pushrod to move to the overrun/cut-off point. Measure the rod protrusion (a) which should now be 1.0 mm. The pushrod should hold at this position for one minute.

18 If rod protrusion is incorrect, or will not hold for the specified period, then the diaphragm or three/four point unit are probably leaking and in need of renewal.



17.16 Three or four point unit check preparation

Pushrod to idle point a = 8.5 mm
1 Vacuum connection
2 and 3 Plug these connections



17.11 Accelerator pump adjustment check showing warm-up lever (A) lever (B) and bolt (C)

Three/four point unit - engine vacuum method

19 Run the engine to normal operating temperature then switch it off. Remove the air cleaner and close the vacuum line from the carburettor to the temperature regulator.

20 With the engine stopped, check the diaphragm pushrod (A) **(see illustration)** is fully extended to approximately 14.5 mm.

21 Start the engine and let it idle. The diaphragm pushrod must now be extended approximately 8.5 mm (three-point unit), or 9.5 mm (four-point unit), and must just contact the fast idle adjustment screw.

22 On models with air conditioning, switch on the air conditioner with the blower on maximum speed. The diaphragm pushrod dimension should be approximately 12.0 mm.

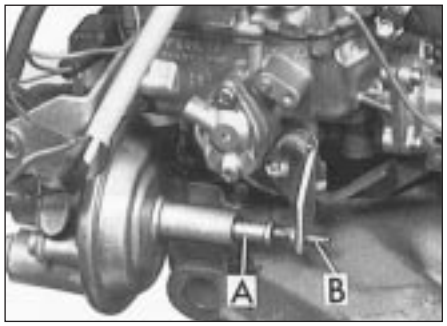
23 To check the overrun cut-off point, run the engine at idle speed.

24 On the four-point unit, disconnect and plug the pink-coloured hose at the control valve.

25 Using a screwdriver, hold the primary throttle valve fully closed to prevent it moving to the overrun cut-off point.

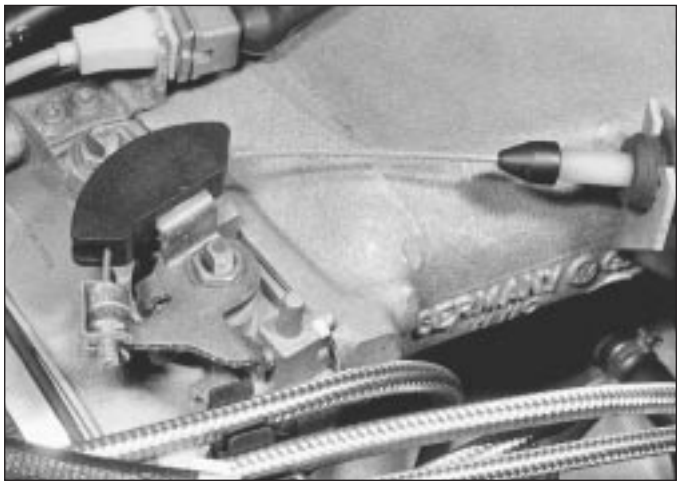
26 Disconnect the plug from the idling/overrun control valve, then check that the diaphragm pushrod dimension is approximately 1.5 mm.

27 To check the unit for leaks, first, on the three-point unit only, pinch the hose between the unit and Y-piece.



17.20 Three/four point unit with pushrod (A) and cold idling adjusting screw (B) in idling position

7.2 Idle CO adjustment screw location (arrowed)



8.2 Accelerator cable connection to throttle valve

4 Switch off all electrical consumers, then pinch the air hose again and adjust idle speed to that specified. When the correct idle speed is reached, unclamp the hose. The idle speed should then increase up to about 1050 rpm at which point the valve will close and the speed drop to the specified idle speed setting.

Valve 2 - checking

5 Run the engine at normal idle speed with the air conditioner switched off. Pinch the air hose and check that the engine speed remains the same.
6 Now switch the air conditioning on and repeat the test. When the hose is pinched, the engine speed should drop.
7 If the air hose and/or valves Nos. 1 or 2 are disconnected or removed for any reason, it is important when refitting to note that the three-way hose connector large hole must go to valve No. 2.

7 **Idle mixture** - adjustment

Note: *Accurate idle mixture adjustment can only be made using an exhaust gas analyser*
1 The idle CO adjustment screw alters the height of the fuel metering distributor plunger relative to the air control plate of the air flow meter.
2 The screw is accessible by removing the locking plug from between the air duct scoop and the fuel metering distributor on the airflow meter casing **(see illustration)**.
3 Although a special tool is recommended for this adjustment, it can be made using a long, thin screwdriver.
4 Ensure that the engine is running under the same conditions as those necessary for adjusting the idling speed and that the idling speed is correct.
5 Connect an exhaust gas analyser to the tailpipe, as directed by the equipment manufacturer, and read the CO level.
6 Turn the adjusting screw clockwise to raise the percentage of CO and anti-clockwise to lower it. It is important that the adjustment is made without pressing down on the adjusting screw, because this will move the airflow sensor plate and affect the adjustment.
7 Remove the tool, accelerate the engine briefly and re-check. If the tool is not removed before the engine is accelerated, there is a danger of the tool becoming jammed and getting bent.
8 Recheck that the idle speed is correct and further adjust if necessary.
9 When reconnection of the crankcase ventilation hose results in an increase in the CO content, the engine oil is diluted with fuel and should be renewed. Alternatively, if an oil change is not due, a long fast drive will reduce the amount of fuel in the oil.

8 **Accelerator cable** - removal, refitting and adjustment

Removal

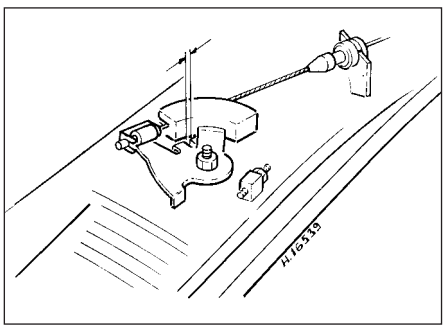
1 Disconnect the battery earth lead.
2 Prise free the inner cable retaining clip from the throttle valve control on the throttle valve housing **(see illustration)**.
3 Release the inner cable from the control quadrant and the outer cable from the location/adjustment bracket on top of the inlet manifold.
4 Prise free and remove the plastic cover from the top of the bulkhead trough.
5 Working inside the vehicle, remove the lower facia panel on the driver's side.
6 Unclip the inner cable from the accelerator pedal, then withdraw the complete cable into the engine compartment, together with the rubber grommets.

Refitting

7 Refitting is a reversal of removal, but ensure that the cable run is not kinked and is correctly aligned, then adjust the cable.

Adjustment

8 Ask an assistant to fully depress the accelerator pedal whilst the cable position is set at the throttle valve housing end.
9 When the throttle valve is fully open, there should be a 1.0 mm clearance between the throttle valve lever and the stop **(see illustration)**.
10 Adjust by altering the cable retainer position at the location/adjustment bracket **(see illustration)**.



8.9 Accelerator cable clearance at full throttle position (arrowed)

8.10 Accelerator cable adjuster and support bracket

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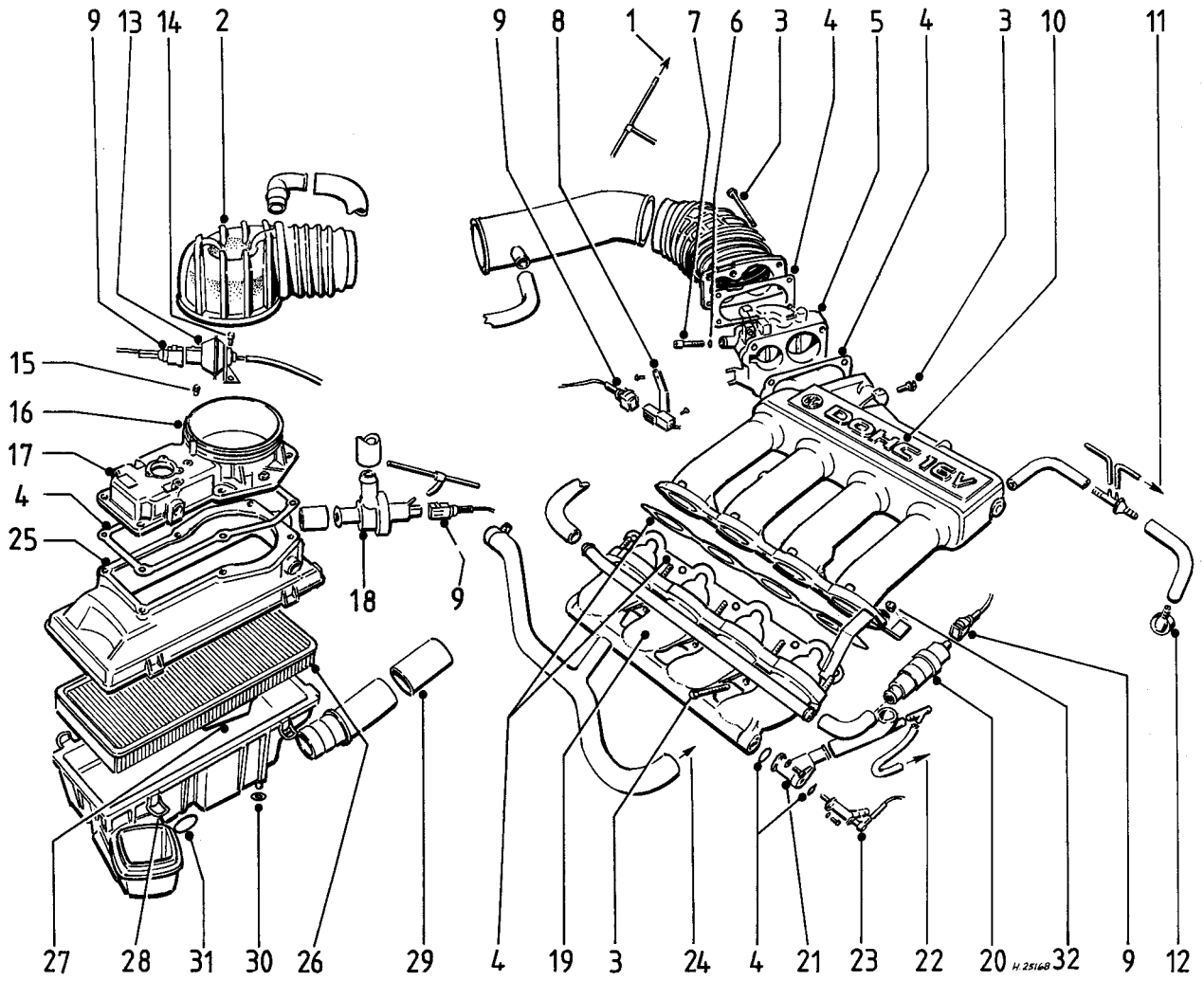
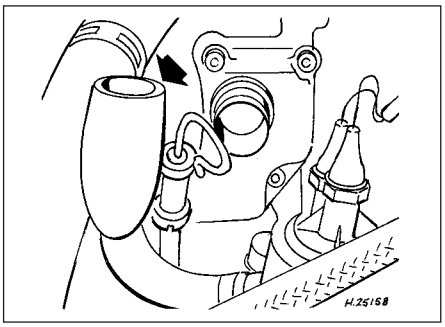
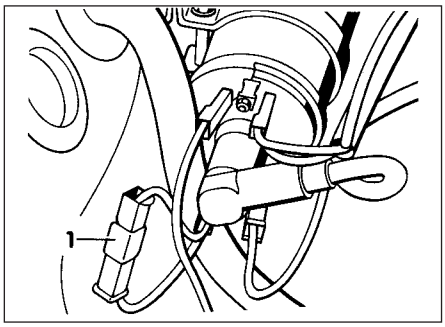


1.0b K-Jetronic system inlet manifold and associated components – 16v engine

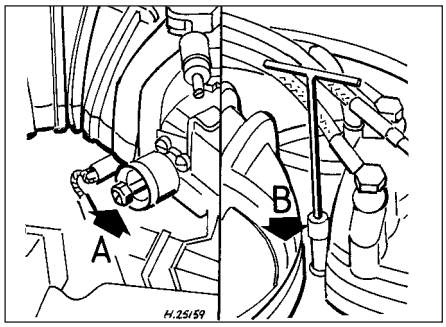
1 To ignition control unit
2 Intake elbow
3 Screw
4 Gaskets
5 Throttle valve housing
6 O-ring
7 Idle speed adjustment screw
8 Throttle valve switch
9 Connector
10 Upper section of inlet manifold
11 To multi-function indicator
12 To brake servo unit
13 Diaphragm pressure valve
14 Screw
15 Plug
16 Mixture (CO) adjustment screw
17 Airflow meter
18 Overrun cut-off valve
19 Lower section of inlet manifold
20 Idle stabilisation control valve
21 Elbow
22 To warm-up valve
23 Cold start valve
24 To crankcase breather
25 Upper air cleaner
26 Air cleaner element
27 Temperature control flap
28 Lower air cleaner
29 Warm air hose
30 Washer
31 Retaining ring
32 Nut



2.2 Disconnecting crankcase ventilation hose



2.6 Idle stabilisation wiring plug (1)



2.7 Idle speed (A) and mixture (B) screws

Chapter 4 Part E:
Fuel and exhaust systems - Digijet fuel injection

Contents

Degrees of difficulty

Easy, suitable for novice with little experience 

Fairly easy, suitable for beginner with some experience 

Fairly difficult, suitable for competent DIY mechanic 

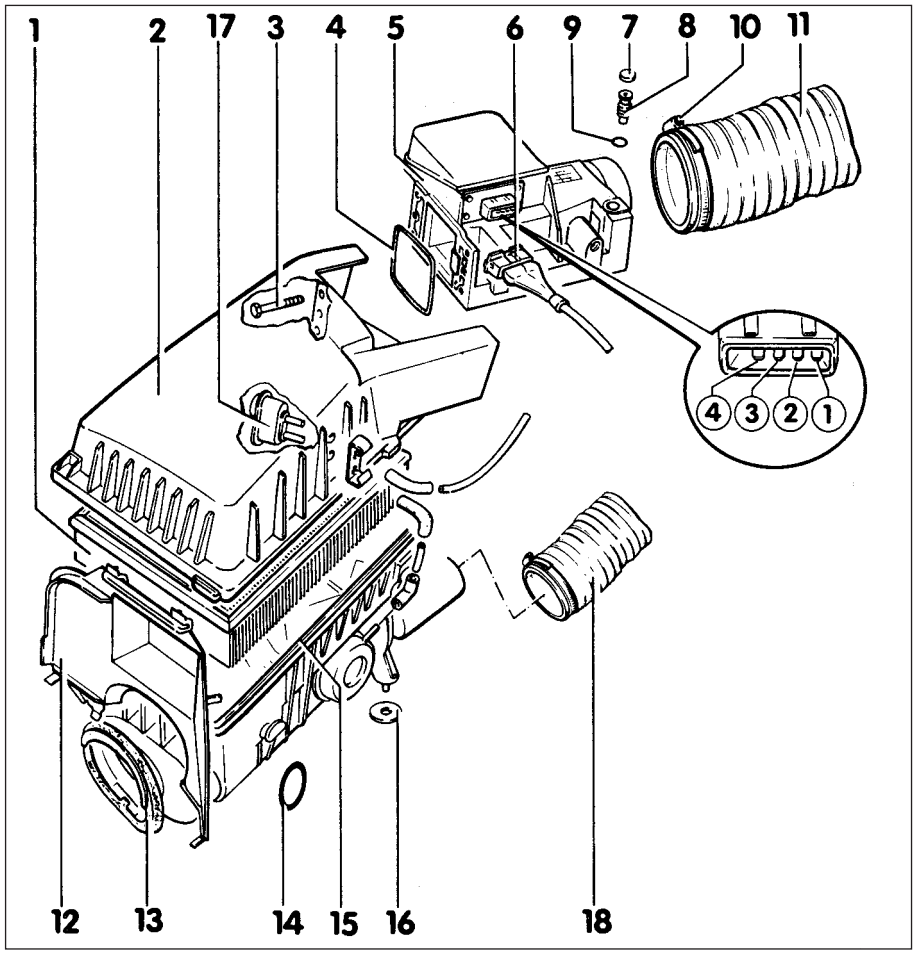
Difficult, suitable for experienced DIY mechanic 

Very difficult, suitable for expert DIY or professional 

Specifications

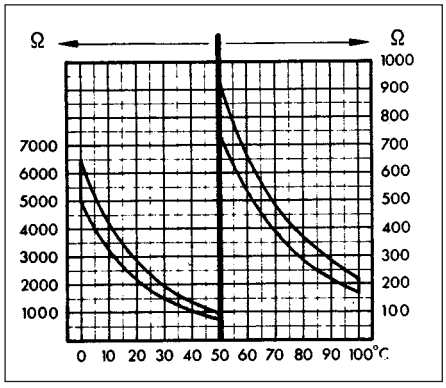
Injection system

Type	Digijet
Application	1.3 litre (code NZ) engine
Control unit code colour:	
Up to July 1989	Copper-brown sticker
From July 1989	Blue sticker
System pressure (approx):	
Vacuum hose connected	2.5 bar
Vacuum hose disconnected	3.0 bar
Idle speed:	
Up to July 1989	750 to 850 rpm
July 1989	880 to 980 rpm
Speed limiter	6400 to 6500 rpm
CO content %:	
Up to July 1989	0.3 to 0.11
July 1989	0.3 to 1.5
Injectors:	
Resistance	15 to 20 ohms
Spray pattern	Conical



9.1 Airflow meter components

1 *Air cleaner element*
2 *Cover*
3 *Bolt*
4 *Seal*
5 *Airflow meter*
6 *Connector*
7 *Tamperproof plug*
8 *Mixture (CO content) adjustment screw*
9 *O-ring*
10 *Clip*
11 *Air inlet hose*
12 *Plate*
13 *Seal*
14 *Retaining ring*
15 *Air cleaner body*
16 *Rubber washer*
17 *Temperature regulator*
18 *Warm air hose*

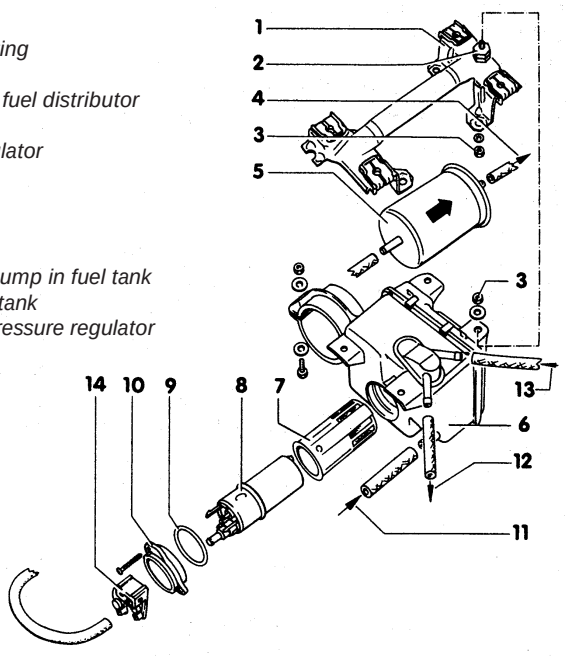


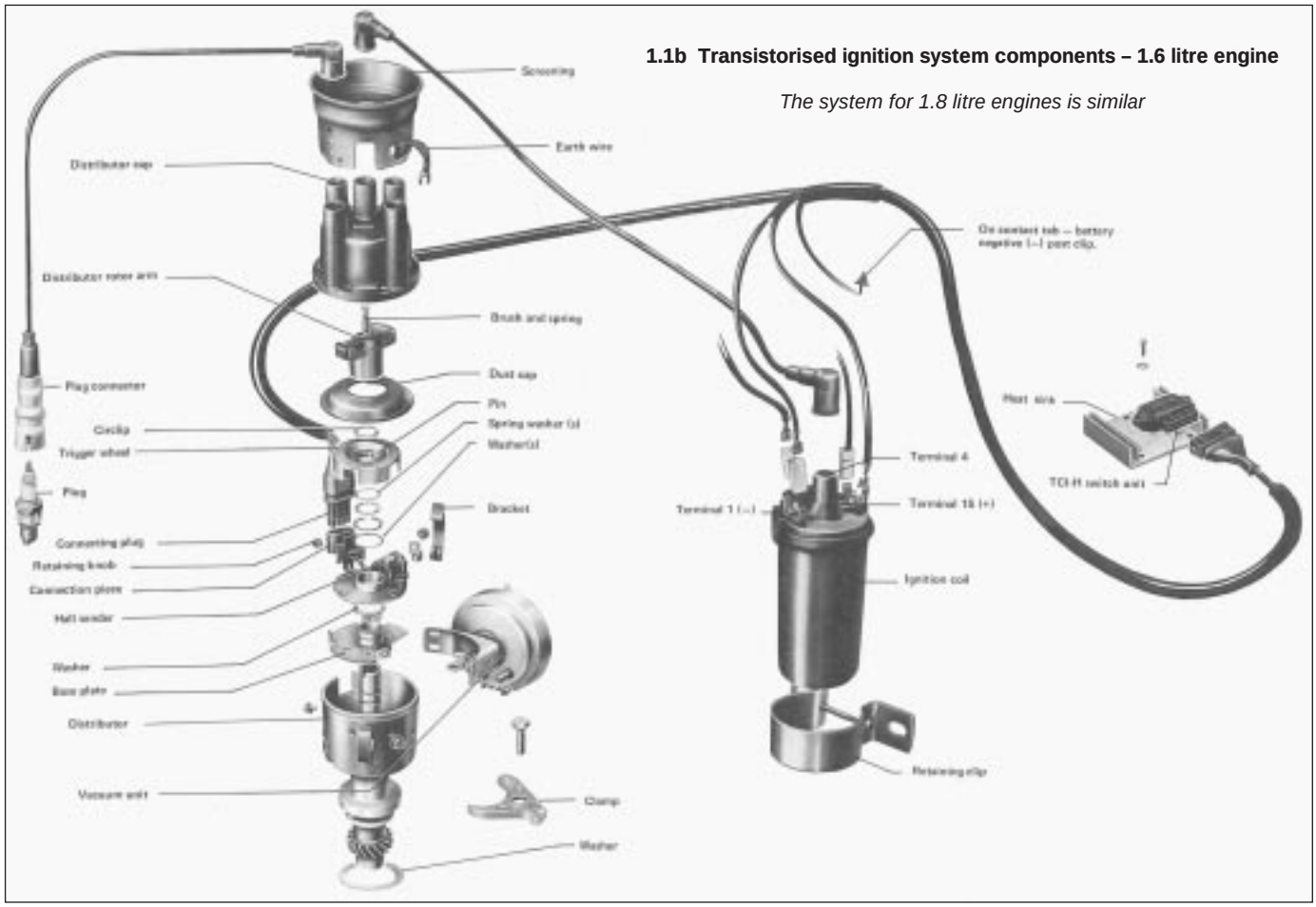
9.2 Inlet air temperature sender resistance graph

4F

12.1 Fuel pump and filter components

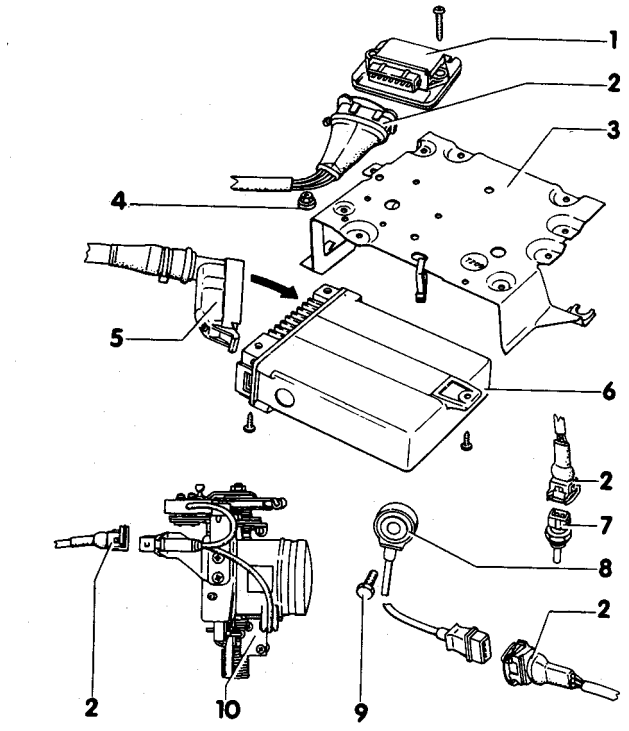
1 *Bracket*
2 *Rubber mounting*
3 *Nut*
4 *Fuel supply to fuel distributor*
5 *Fuel filter*
6 *Pump accumulator*
7 *Strainer*
8 *Fuel pump*
9 *O-ring*
10 *Retainer*
11 *From fuel lift pump in fuel tank*
12 *Return to fuel tank*
13 *Return from pressure regulator*
14 *Adapter*





1.1b Transistorised ignition system components – 1.6 litre engine

The system for 1.8 litre engines is similar



1.5 Digifant ignition system components

1 TCI-H switch unit
2 Connector
3 Plate
4 Nut
5 Connector
6 Digifant control unit
7 Temperature sender
8 Knock sensor
9 Bolt
10 Throttle valve switch 1

5B

Chapter 5 Part D:
Starting and charging systems

Contents

Degrees of difficulty

Easy, suitable for novice with little experience

Fairly easy, suitable for beginner with some experience

Fairly difficult, suitable for competent DIY mechanic

Difficult, suitable for experienced DIY mechanic

Very difficult, suitable for expert DIY or professional

Specifications

System

Type	12 volt, negative earth

Battery

Rating	36 Ah or 45 Ah
Minimum voltage (under load)	9.6 volts at 110 amps

Alternator

Type	Bosch or Motorola	
Maximum output	55, 65 or 90 amp	
Minimum allowable brush length	5.0 mm	
Rotor winding resistance (ohms):	**Bosch**	**Motorola**
55 amp	2.9 to 3.2	3.1 to 3.3
65 amp	2.8 to 3.1	3.9 to 4.1
90 amp	3.0 to 4.0	-

Starter motor

Type	Pre-engaged
Application/VW part No:	
1.05 and 1.3 litre	036 911 023 G
1.3 litre	036 911 023 H
1.6 litre:	
Manual gearbox	055 911 023 G
Automatic transmission	055 911 023 A
1.8 litre	027 911 023

Torque wrench settings

	Nm	**lbf ft**
Starter motor		
1.05 and 1.3 litre	20	15
1.6 and 1.8 litre (manual gearbox)	60	44
1.6 litre (automatic transmission)	20	15
Alternator		
Pulley nut	40	30
Mounting (to engine) bolts	45	33
Mounting/alternator pivot bolt	45	33
Adjuster strap bolts	25	18

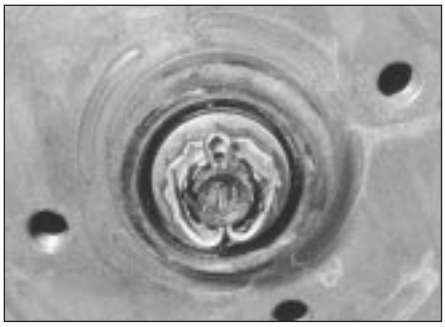
4.15 . . . followed by the outer washer and bearing

15 Undo the hub nut and then withdraw the thrustwasher and outer taper bearing race **(see illustration)**.
16 Withdraw the disc from the stub axle.
17 Unless a disc is being renewed after a low mileage due to damage or other defect, both discs must be renewed at the same time.
18 Refer to the following Section for hub bearing replacement.
19 Lubricate the stub axle with grease then fit the disc over it, taking care not to damage the inner oil seal lips.
20 Lubricate the outer taper roller bearing with grease and locate it onto the stub axle against its bearing outer race.
21 Refit the thrustwasher, engaging the inner lug with the groove in the stub axle. Hand tighten the securing nut to the point where the thrustwasher can just be moved with a screwdriver and finger pressure but without levering it. Check that the disc rotates freely without binding or excessive endfloat, then locate the locking ring over the nut and insert a new split pin to secure.
22 Half fill the hub cap with bearing grease and tap it carefully into position .
23 Before refitting the brake carrier, check that the protective caps and guide pins are not damaged. If they are, then the carrier must be renewed. Locate and fit the carrier retaining bolts, tightening to the specified torque setting.
24 The caliper can now be refitted.

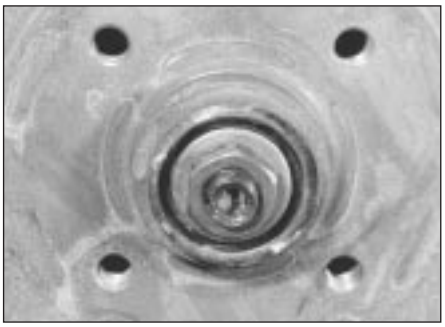
5 Rear hub bearings - renewal

1 Remove the rear brake disc.
2 Remove the inner bearing from the disc by levering free the dust cap, prising out the oil seal and extracting the bearing.
3 The bearing outer races can be removed from the disc by drifting them out with a soft drift whilst supporting the disc.
4 Check that the bearing recesses in the disc are clean, support the disc and drive the new bearing outer races into position by using a suitable tube drift. Ensure that they are fully home.
5 Lubricate the inner bearing with grease and locate it onto its outer race. The oil seal can now be driven into position. Lubricate its seal lip when fitted.
6 Drive the dust cap into position using a suitable tube drift.
7 Refit the rear brake disc.

6.4a Remove the hub cap . . .



6.4b . . . the split pin and lock ring



6.5a Undo the hub nut . . .

6.5b . . . remove the thrustwasher . . .

6.5c . . . and outer bearing

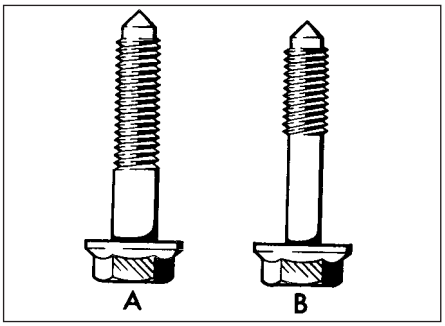
6 Rear brake shoes - inspection and renewal

Inspection

1 Jack up the rear of the vehicle and support it on axle stands (see "*Jacking and vehicle support*"). Chock the front wheels.
2 Working beneath the vehicle, remove the rubber plugs from the front of the backplates and check with a torch that the linings are not worn below the minimum thickness specified. On completion, refit the plugs.

Removal

3 Remove the rear wheels.
4 Prise off the hub cap then extract the split pin and remove the locking ring **(see illustrations)**.
5 Unscrew the hub nut and remove the thrustwasher and outer wheel bearing **(see illustrations)**.
6 Check that the handbrake is fully released, then withdraw the brake drum. If difficulty is experienced, the brake shoes must be backed away from the drum first. To do this, insert a screwdriver through one of the bolt holes and push the automatic adjuster wedge upwards against the spring tension. This will release the shoes from the drum.
7 Brush all dust from the brake drum, shoes and backplate whilst taking care not inhale it. Scrape any scale or rust from the drum. Note that the shoes should be renewed as a set of four.
8 Using a pair of pliers, depress the steady spring cups, turn them through 90° and remove the cups, springs and pins **(see illustration)**.
9 Note the location of the return springs and strut on the brake shoes, then lever the shoes from the bottom anchor. Unhook and remove the lower return spring **(see illustration)**.
10 Disengage the handbrake cable from the lever on the trailing brake shoe **(see illustration)**.
11 Release the brake shoes from the wheel cylinder, unhook the wedge spring and upper return spring and withdraw the shoes **(see illustration)**.



3.2 Front suspension camber adjustment bolts for later models

A Standard 12.0 mm diameter bolt
B Special 11.0 mm diameter bolt

3 Front suspension - camber adjustment

Early models

1 On early models, front suspension camber adjustment is possible by loosening the two bolts securing the strut to the wheel bearing housing, then turning the eccentric top bolt as required. The position of the eccentric bolt must be accurately marked before removing it, otherwise the camber adjustment will have to be reset.

Later models

2 On later models no adjustment is possible as assembly tolerances have been reduced sufficiently to make any adjustment unnecessary. However, in isolated instances, it may be found that slight correction of the camber angle within 1° or 2° is required. In this case, a special bolt (part no. N 903-334-01) can be obtained from a VW dealer. The bolt shank is of 11 mm diameter instead of the standard 12 mm diameter and allows a small amount of adjustment to be made **(see illustration)**.
3 This special bolt should first be fitted in the top bolt position. If this does not provide sufficient adjustment, the lower bolt should also be changed for the special type. No attempt should be made to reduce the diameter of the original bolts.

4 Front anti-roll bar - removal and refitting

Removal

1 Apply the handbrake then jack up the front of the vehicle and support it on axle stands (see "*Jacking and vehicle support*").
2 Undo and remove the anti-roll bar eye bolt nuts from the underside of the track control arm each side **(see illustration)**.
3 Position a jack under the subframe to support it.

4.2 Anti-roll bar eye bolt nut (arrowed)

4 Undo the subframe-to-body strut retaining bolt at the rear end. Loosen the front bolt and swing the strut round to provide clearance for anti-roll bar and bush removal. Repeat on the other side.
5 Lift the anti-roll bar eye bolts and disengage them from the anti-roll bar **(see illustration)**. Note the location and orientation of the eye bolt bushes and washers. Remove the anti-roll bar.
6 Renew the anti-roll bar if damaged or distorted. Renew the bushes if perished or worn.

Refitting

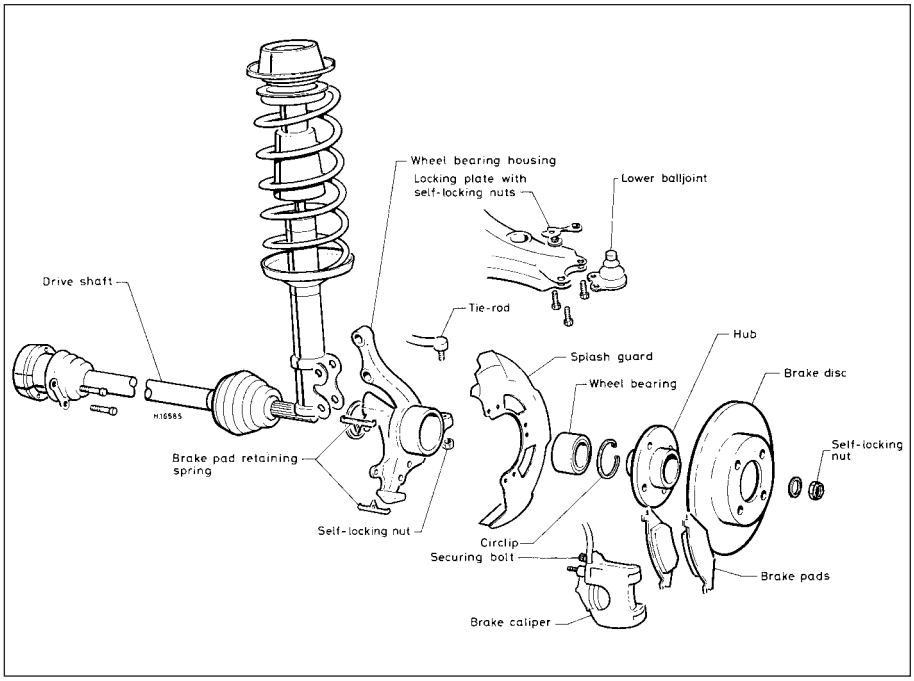
7 Refitting is a reversal of the removal procedure. Check that the eye bolt bushes are fitted with their conical face towards the washers, the cover faces of which must face away from the bush mountings.
8 Do not fully tighten the retaining nuts and bolts until the vehicle is free standing and has been bounced a few times to settle the mountings.

4.5 Anti-roll bar location in eye bolt

5 Front wheel bearing housing - removal and refitting

Removal

1 Remove the driveshaft on the side concerned.
2 Disconnect the tie-rod balljoint from the wheel bearing housing **(see illustration)**.
3 Remove the brake caliper. Leave the brake hydraulic line connected to the caliper and hang up the caliper to support it. Disconnect the hydraulic line location bracket from the strut.
4 Undo the retaining screw and remove the brake disc.
5 Scribe an alignment mark around the periphery of the suspension strut-to-wheel bearing housing location lugs, to ensure accurate positioning when refitting.



5.2 Wheel bearing housing and associated components

Removal

2 To remove the pump unit, first drain the system fluid.
3 Disconnect the pressure hose from the pump unit **(see illustration)**.
4 Loosen the pump unit retaining bolts and pivot the pump so that the drivebelt can be disconnected from the pulley.
5 Support the pump, withdraw the retaining bolts and withdraw the pump unit.

Refitting

6 Refitting is a reversal of removal. Tension the drivebelt, top-up with new fluid and bleed the system.

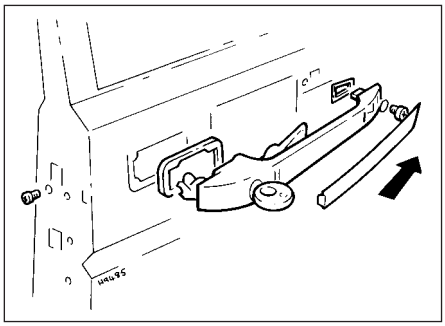
Drivebelt adjustment

7 Refer to Chapter 1, Section 13.

20 Wheel alignment - checking and adjustment

1 Accurate wheel alignment is essential for good steering and slow tyre wear. Alignment details are given in *Specifications* and can be accurately checked by a suitably equipped garage. However, front wheel alignment gauges can be obtained from most motor accessory stores and used as follows.
2 Check that the vehicle is only loaded to kerbside weight, with a full fuel tank and the tyres correctly inflated.
3 Position the vehicle on level ground with the wheels straight-ahead, then roll the vehicle backwards 4.0 m and forwards again.
4 Using a wheel alignment gauge in accordance with the manufacturer's instructions, check that the front wheel toe dimension is as specified. If adjustment is necessary, loosen the balljoint-to-tie-rod locknut on the right-hand side and turn the tie-rod as required, then retighten the locknut. Note that the left-hand tie-rod is set at the specified length - **see illustration 15.11**. Its setting should not be changed.
5 Although the camber angle of the front wheels can be adjusted, this is a task best entrusted to your VW dealer.
6 The castor angle is not adjustable. As with the camber angle, is best checked by your VW dealer.

15.3 Removing interior door handle and finger plate



15.8 Exterior door handle components

Remove handle in direction of arrow

16.1 Door check strap and hinge

15 Door handles - removal and refitting

Interior

1 Remove the door trim panel.
2 Pull the foam seal away then prise the retainer from the bottom of the handle **(see illustrations)**.
3 Press the finger plate forwards out of the door and unhook it from the rod **(see illustration)**.
4 Refitting is a reversal of removal.

Exterior

5 Remove the door trim panel.
6 Using a small screwdriver, lever the plastic strip from the exterior door handle.
7 Remove the cross-head screws from the handle grip and the end of the door.
8 Withdraw the handle and release it from the lock **(see illustration)**. Remove the gaskets.
9 Refitting is a reversal of removal. Fit new gaskets if necessary.

16 Door - removal and refitting

Removal

1 Open the door and use a punch to drive the pivot pin up from the check strap **(see illustration)**.
2 Mark the position of the door on its hinges.
3 Support the door then unscrew and remove the lower hinge bolt followed by the upper hinge bolt. Withdraw the door from the vehicle.

Refitting

4 Refitting is a reversal of removal.
5 If necessary, adjust the position of the door on the hinges so that when closed, it is level with the surrounding bodywork and central within the body aperture.
6 Lubricate the hinges with a little oil and the check strap with grease.
7 If necessary, adjust the door striker position.

17 Door striker - adjustment

1 Mark round the door striker with a pencil or fine ballpoint pen **(see illustration)**.
2 Fit a spanner to the hexagon on the striker and unscrew the striker about one turn so that it moves when tapped with a soft-headed hammer.
3 If the door has been rattling, tap the striker towards the inside of the vehicle.
4 If the door fits too tightly, tap the striker towards the outside of the vehicle.
5 At all times, be careful to keep the striker in the same horizontal line unless it also requires vertical adjustment. Only move the striker a small amount at a time. The actual amount moved can be checked by reference to the marks made before the striker was loosened.
6 When a position has been found in which the door closes firmly but without difficulty, then tighten the striker.

18 Door lock - removal and refitting

Removal

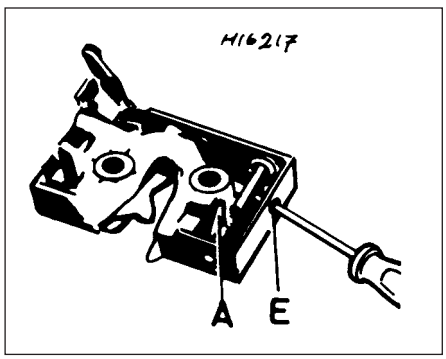
1 It is not necessary to remove the trim panel to carry out this task.
2 Open the door and set the lock in the locked position, either by moving the interior knob or by turning the exterior key.
3 Using an Allen key, unscrew the retaining screws and withdraw the lock approximately 12 mm to expose the operating lever **(see illustration)** .
4 Retain the operating lever in the extended position by inserting a screwdriver through the hole in the bottom of the lock **(see illustration)**.
5 Unhook the remote control rod from the operating lever and pull the upper lever from the sleeve. Withdraw the lock from the door.

Refitting

6 Refitting is a reversal of removal. Set the lock in the locked position first and ensure that the lugs on the plastic sleeve are correctly seated.

17.1 Door striker

18.3 Door lock



18.4 Using a screwdriver through the door lock hole (E) to retain operating lever (A) in extended position

Chapter 12
Body electrical systems

Contents

Degrees of difficulty

Easy, suitable for novice with little experience 

Fairly easy, suitable for beginner with some experience 

Fairly difficult, suitable for competent DIY mechanic 

Difficult, suitable for experienced DIY mechanic 

Very difficult, suitable for expert DIY or professional 

Specifications

System

Type	12 volt, negative earth

Fuses - pre August 1989

Fuse	Component	Rating (amps)
1	Radiator fan	30
2	Brake light	10
3	Cigarette lighter, radio, clock, interior light, central locking, boot light (Jetta)	15
4	Emergency light system	15
5	Fuel pump	15
6	Foglights (main current)	15
7	Tail and sidelights, left	10
8	Tail and sidelights, right	10
9	High beam right, high beam warning lamp	10
10	High beam, left	10
11	Windscreen wipers and washer, headlight washer	15
12	Rear wiper and washer, seat heater control, electric mirror control	15
13	Rear window heating, mirror heating	15
14	Blower, glovebox light	20
15	Reversing lights, shift pattern illumination (automatic transmission)	10
16	Horn	15
17	Carburettor	10
18	Horn (dual tone), coolant level warning lamp	15
19	Turn signals, stop-start system, brake warning lamp	10
20	Number plate light, foglights (switch current)	10
21	Low beam, left, headlight range control, left	10
22	Low beam right, headlight range control, right	10

Component testing

Voltage stabiliser

11 To test the voltage stabiliser, connect a voltmeter between the terminals shown **(see illustration)** with a 12 volt supply to the remaining terminal. A constant voltage of 10 volts must be registered. If the voltage is above 10.5 volts or below 9.5 volts renew the voltage stabiliser.

Fuel gauge

12 The accuracy of the fuel gauge can be checked by draining the fuel tank and then adding exactly 5 litres of fuel. After leaving the ignition switched on for at least two minutes the fuel gauge needle should be level with the upper edge of the red reserve zone. If not, either the fuel gauge or tank unit is faulty.

Printed circuits

13 The individual circuits of the printed circuit foil can be checked for continuity using an ohmmeter and referring to the appropriate wiring diagram.

Reassembly

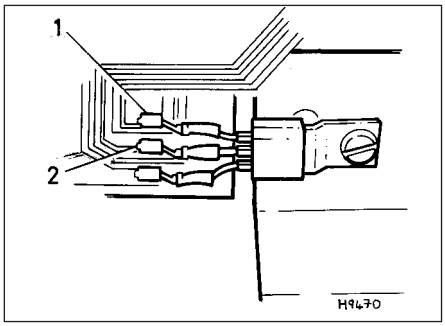
14 Reassembly of the instrument panel is a reversal of the dismantling procedure.

18 Facia trim panel - removal and refitting

1 Disconnect the battery earth lead.
2 To improve accessibility, remove the steering wheel.

18.6a Facia trim panel retaining screw through fader control aperture

18.6b Remove instrument panel retaining screws at top



17.11 Voltage stabiliser test terminals

Connect a voltmeter between 1 and 2

3 Remove the radio.
4 Pull free the heater/fresh air control lever knobs, then release the control panel retaining clips around the outer edge and pull out the panel. Detach the wiring multi-connectors.
5 Remove the lower switches from the facia panel and where applicable, remove the blank pads by prising them free.
6 Unscrew the facia trim panel retaining screws from the following locations:

a) Light switch aperture
b) Top inner edge of radio aperture
c) Fader control (or blank) aperture ***(see illustration)***
d) Heater control panel aperture
e) Top of the instrument panel ***(see illustration)***
f) Top left side of panel

7 Partially withdraw the panel and detach any remaining switch lead multi-connectors. Remove the facia panel **(see illustration)**.
8 Refit in the reverse order of removal, ensuring that all wiring connections are securely made.
9 On completion, check for correct operation of the various switches and controls.

19 Multi-function indicator - operation and testing

Some models are equipped with a multi-function indicator consisting of an electronic processor and digital display unit. With the ignition switched on, the following information can be accessed by repeatedly pressing the MFA recall button on the end of the windscreen wiper control stalk.

Current time
Driving time
Distance driven
Average speed
Average fuel consumption
Engine oil temperature
Ambient temperature

Should a fault occur in the system, the associated wiring should be checked for security and damage, particularly where it connects to the various sensors. Further checks should be made by a VW dealer using the special test instruments necessary.

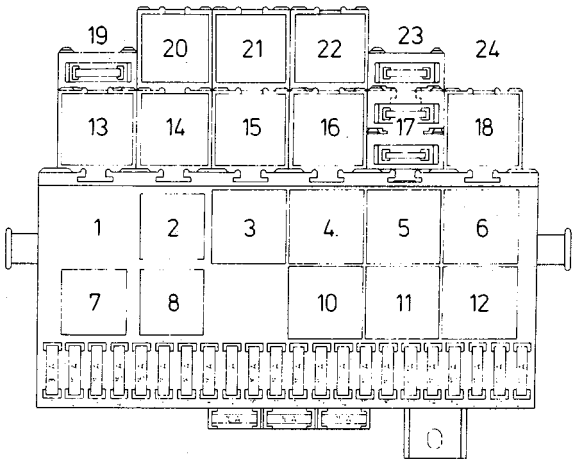
20 Gearchange and consumption gauge - operation

1 When fitted, the gearchange and consumption gauge is fitted in the instrument panel in place of the coolant temperature gauge.
2 The gearchange indicator lights up in all gears except top gear when better economy without loss of power can be obtained by changing up to a higher gear. The indicator does not operate during acceleration or deceleration, or on carburettor engines when the engine is cold.
3 The gearchange indicator light goes out when a higher gear is engaged .
4 On automatic transmission models, the gearchange indicator is non-operational since all forward gears are automatically changed in accordance with engine speed/output and vehicle speed.
5 The fuel consumption indicator operates only in top gear (D in automatic transmission models) and indicates the actual fuel consumption in mpg.
6 The gearchange and consumption gauge is operated by a switch on the gearbox and a sender in the vacuum line to the distributor **(see illustration)**.

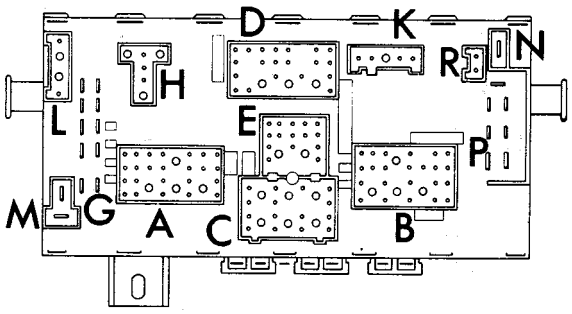
18.7 Facia trim panel removal

20.6 Fuel consumption gauge sender unit

Relay locations



Connections



Wiring relays and connections – all models

Relays (typical)

1 Vacant
2 Intake manifold preheating relay (carburettor models) or fuel pump relay (injection models)
3 Seat belt warning system relay
4 Gearshift indicator control unit
5 Air conditioner relay
6 Dual tone horn relay
7 Relay for foglights and rear foglight
8 Relief relay for X contact
10 Intermittent wash/wipe relay
11 Rear window wiper relay
12 Turn signal flasher or trailer towing warning relay
13 Seat belt warning system (interlock) or rear window, driving lights and oil pressure warning relay
14 Window lift or seat belt warning system relay
15 Headlight washer relay
16 Control unit for idling speed increase
17 Fuse for rear foglight
18 Control unit for coolant shortage indicator
19 Thermo fuse for window lifters
20 Switch unit for heated driver's seat
21 Switch unit for heated passenger's seat
22 Switch unit for overrun cut-off
23 Vacant
24 Vacant

Relays are symbolised as a number in a black box

Not all relays are fitted to all models

Connections

A Multi-pin connector (blue) for dash panel loom
B Multi-pin connector (red) for dash panel loom
C Multi-pin connector (yellow) for engine compartment loom left
D Multi-pin connector (white) for engine compartment loom right
E Multi-pin connector (black) for rear wiring loom
G Single connector
H Multi-pin connector (brown) for air conditioner or wiring loom
K Multi-pin connector (transparent) for seat belt warning system loom
L Multi-pin connector (black) for lighting switch terminal 56 and dip and flasher switch terminal 56b (carburettor models) or multi-pin connector (grey) for dual tone horn (injection models)
M Multi-pin connector (black) for lighting switch terminal 56 and dip and flasher switch terminal 56b (injection models)
N Single connector for separate fuse (manifold heater element)
P Single connector (terminal 30)
R Not in use

Fuse colours

Blue	5A
Green	30A
Red	10A
Yellow	20A

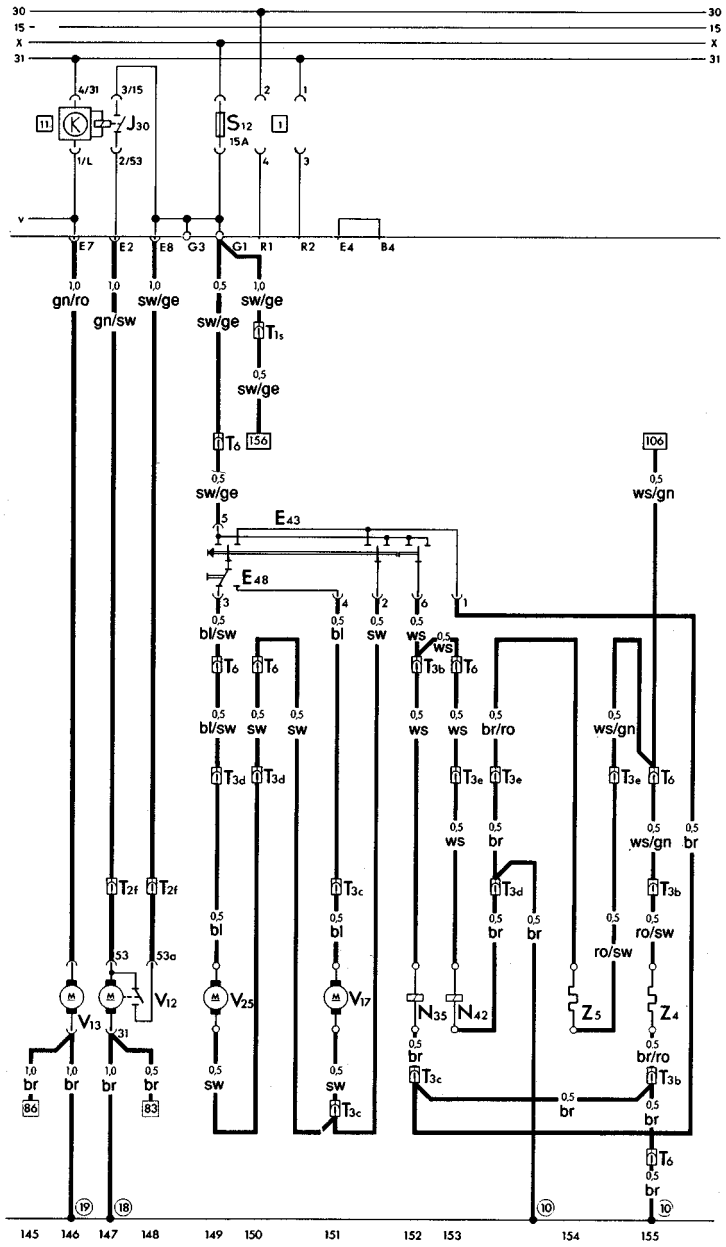


Diagram 20 Electrically-controlled heated outside mirror and rear wiper and washer - 1.8 models, pre December 1985

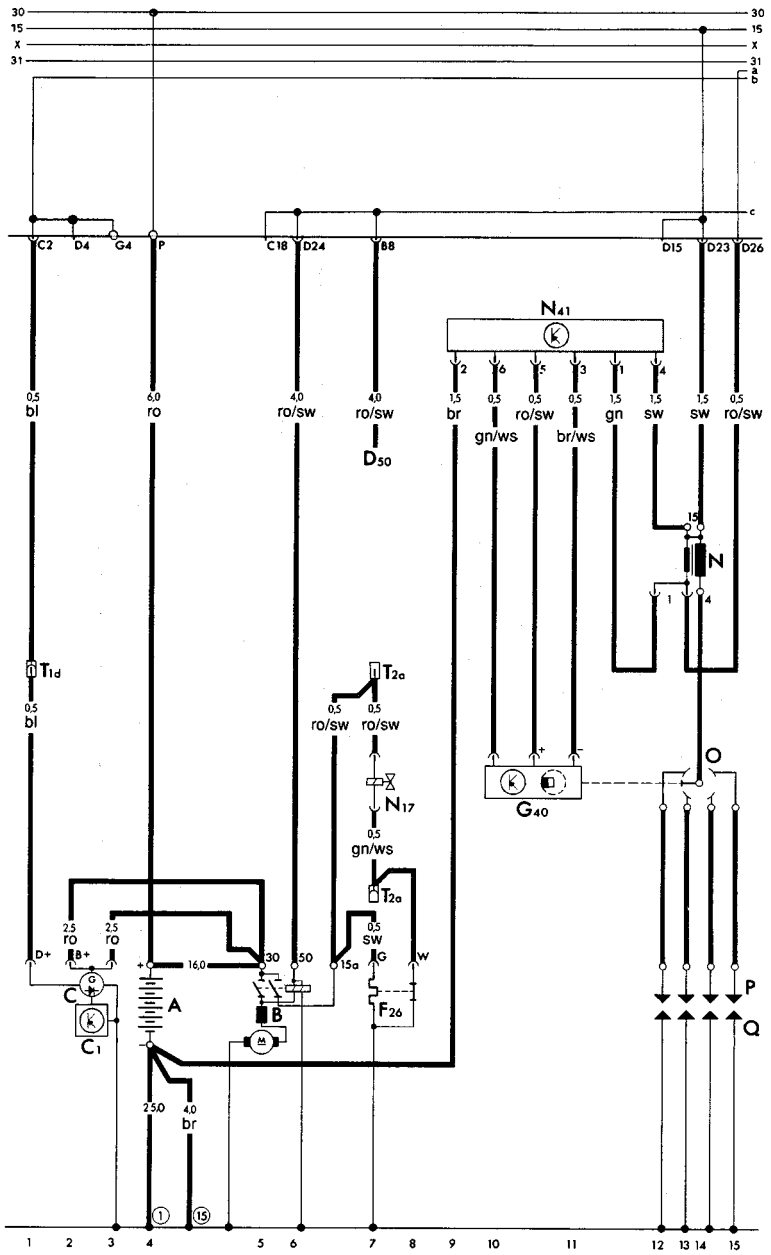


Diagram 21 Electric windows - 1.8 models with carburettor, pre July 1987

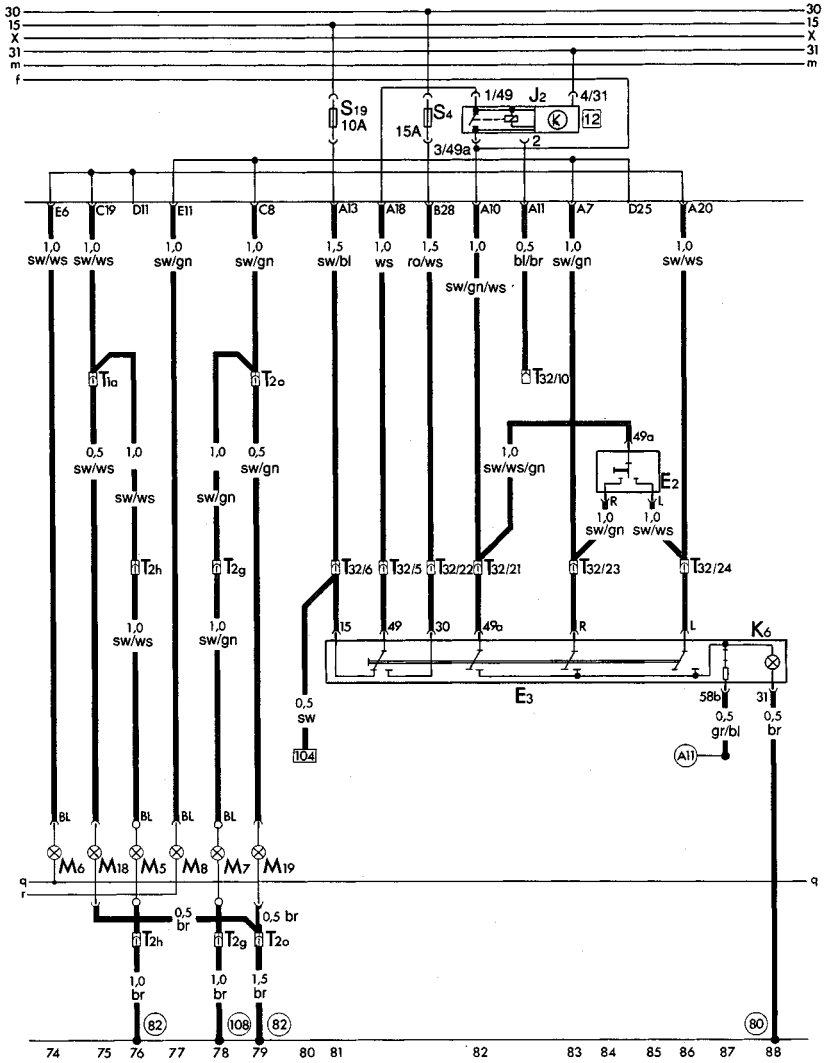


Diagram 41 Indicators and hazard warning lights - all models, from August 1987

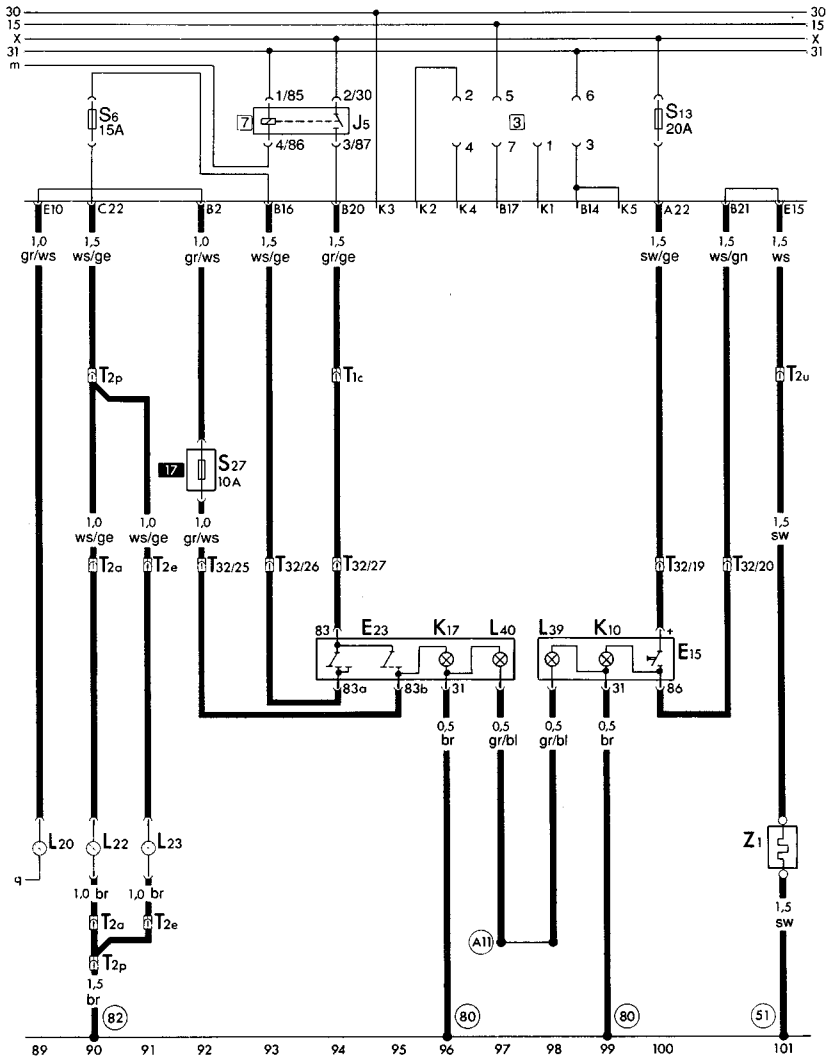


Diagram 42 Foglights, rear foglights and heated rear window - all models, from August 1987

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