

Fault finding at a glance

When checking, always begin with the faults at the top of the list. These are the most likely to be the cause of the trouble, and their remedies are usually the simplest. The symbol ● indicates that the job is within the scope of a home mechanic. The symbol ■ indicates that the work is beyond the scope of all but the most experienced mechanics, and you should consult a garage. The ▲ sign indicates that on emission-control carburettors, the work must be done by a specialist.

Engine starting conditions

Symptom	Fault	Remedy	
Starter will not turn engine (headlamps dim)	Battery low in charge, often causing the solenoid to chatter	Charge battery ● (p. 195) and check charging system ■	
	Defective battery	Replace battery ●	
	Corroded battery cables or loose connections	Clean battery connections or replace battery cables. Tighten battery and starter-motor connections ● (p. 195)	
	Starter jammed	Free starter ● (p. 230)	
	Water in cylinders or seized engine	Remove spark-plugs to check (p. 202). Seek help ■	
	(Headlamps bright)	Defective starter solenoid	Replace ● (p. 230)
		Defective starter engagement, confirmed by starter-motor whine	Clean Bendix unit ● (p. 231)
		Defective starter	Repair or replace ● (p. 231)
		Defective starter switch	Replace ■
		On automatic cars	Select park or neutral ●
Engine turns slowly but will not start	Battery low in charge	Charge battery ● (p. 195) and check charging system ■	
	Defective battery	Replace battery ●	
	Corroded battery cables or loose connections	Clean battery connections or replace battery cables. Tighten battery and starter-motor connections ● (p. 195)	
	Bad engine-to-chassis earth strap	Clean or replace ● (p. 228)	
	Defective starter	Repair or replace ● (p. 231)	
	Incorrect viscosity of engine oil in crankcase (if multigrade oil is not being used)	Drain crankcase and refill with proper-viscosity engine oil (p. 81). Change oil filter if necessary ● (p. 228)	
Engine turns normally but will not fire	Ignition fault		
	Where no spark is observed at plug lead	Check for spark at plug lead ● (p. 194)	
	Where spark is observed at plug lead	Check output from coil to confirm high or low-tension fault. If there is a spark from the coil, check HT leads, distributor cap and rotor arm, particularly for cracks, tracking or dampness. Where no spark is observed from coil output, check ignition-coil connections and contact-breaker points for short circuits or disconnection ● (p. 194)	
	If fuel is reaching carburettor	Remove air cleaner at carburettor and check choke operation. If necessary, assist with gentle finger pressure—a drop of oil on the butterfly spindle may help. Loosen petrol-pipe union at carburettor. Turn engine by starter for a mechanical pump, or switch on ignition for electric pump. Check if petrol is being delivered ● (p. 193)	
		Look into carburettor mouth. Operate throttle and observe whether damp or dry. If dry, clean jets and needle valve (p. 193). If damp, remove spark-plugs, dry, clean and check gaps ● (p. 202)	

Engine starting conditions

Symptom

Fault

Remedy

Engine turns normally but will not fire
(contd)

No fuel to carburettor

Remove petrol-tank cap and check for fuel (fuel gauge may be inaccurate) ●

If car is fitted with electric fuel pump

Check pump has a good earth and give pump a sharp tap. If it starts pumping, which will be heard, replace pump ● (p. 191). If not, seek advice, as fuel lines may be blocked ■

Where a mechanical pump is fitted

Check if there is a tap in the fuel line at the inlet to the pump. Make sure that any tap is switched on. Remove pump-top cover, clean pump filter and make sure the cover, when refitted, is airtight. Check flexible pipe to pump for air leaks ● (p. 192). If the fault is not found, seek advice ■

Engine backfires violently, kicks back or bangs through carburettor

Ignition timing faulty

Check and reset ignition timing ● (p. 200)

Damp distributor cap and leads

Dry thoroughly and check firing order ● (p. 196)

Engine fires, but fails to keep running

Ignition or fuel fault

Refer to order of checks for 'Engine turns normally but will not fire' (p. 162), with special emphasis on choke, plug condition and continuous HT spark at plug lead ●

Engine performance

Engine stalls when idling (engine cold)

Choke throttle-stop requires adjustment

Adjust ● (pp. 190 and 193)

Choke not operating correctly

Remove air cleaner. Check choke operation ● (p. 193)

Engine stalls when idling (engine hot)

Engine idle speed too low

Adjust idle speed if possible ● (p. 190)

Engine idle fuel mixture improperly adjusted

Adjust idle fuel mixture if possible ● (pp. 189 and 190) ▲

Pilot air jet blocked

Clean ● (p. 187)

Choke stuck in operation

Check choke operation at carburettor ● (p. 193)

Contact-breaker points incorrectly set or worn

Clean and adjust or replace breaker points ● (p. 198)

Carburettor flooding

Adjust fuel level or float setting to specification. Clean needle valve ● (p. 193)

Intake vacuum leak

Check manifold, carburettor mounting, any connections to manifold and vacuum advance. Also check butterfly spindle and bosses; if worn, seek advice ■

Engine has rough idle

Idle mixture and throttle-stop screw out of adjustment

Adjust idle-speed fuel mixture and idle speed to specifications ● (pp. 188 and 190) ▲

Contact-breaker points incorrectly set or worn

Clean and adjust (or replace) breaker points ● (p. 198)

Fouled or improperly gapped spark-plugs

Clean and adjust plug gaps or replace plugs ● (p. 202)

Incorrect ignition timing

Adjust ● (p. 200)

Intake vacuum leak

Check manifold, carburettor mounting, any connections to manifold and vacuum advance ● (pp. 187 and 197)

Engine stalls on acceleration

Carburettor accelerator pump inoperative or not functioning properly

Check fuel supply into float chamber (p. 187) ● before repairing accelerator pump ■

Choke not functioning properly or improperly adjusted

Check choke operation at carburettor ● (p. 193)

Insufficient fuel supply to carburettor

Clean needle valve and jets. Check float level ● (p. 193)

Fault finding

Engine performance (contd)

Symptom	Fault	Remedy
Engine stalls on acceleration (contd)	Short in distributor caused by automatic-advance operation	Check internal distributor wires for short ● (p. 197)
	Air-cleaner element dirty	Clean or replace filter element. Observe recommended maintenance schedule ● (p. 186)
	Variable-choke carburettor (SU or Stromberg) has a seized piston	Polish piston and cylinder with dry or petrol-damp rag. Check that correct oil is used in dash-pot and top up to the required level ● (p. 189)
	Cars with 2-stroke engines—blocked exhaust	Clean or change silencers ● (p. 261)
Engine has poor acceleration	Incorrect ignition timing	Adjust ● (p. 200)
	Intake vacuum leak	Tighten or replace faulty gaskets ● (p. 185)
	Insufficient fuel supply	Clean needle valve and jets. Check fuel ● (pp. 192 and 193)
	Accelerator linkage out of adjustment	Check that full throttle in the car is also full throttle at the carburettor. Adjust as necessary ■
	Valve clearances incorrect	Adjust clearances ● (p. 181)
	Insufficient engine compression	Regrind valves or replace cylinder-head gasket ● (p. 184)
	Incorrect distributor automatic advance	Replace worn or damaged parts. Adjust engine timing to specifications ● (p. 200). Remove restriction or carry out repair, or tighten connections in vacuum line ● (p. 197)
Engine misses or surges	Spark-plug breakdown. Ignition circuit defective	Clean, test or replace ● (p. 202). Check spark, contact-breaker, LT and HT wiring. Ensure all parts of ignition system are clean and dry (p. 194). Check timing ● (p. 200)
	Damaged HT leads where suppressed lead or suppressor is fitted	Check if lead is broken. If so, the lead should be changed ● (p. 194)
	Intake vacuum leaks	Tighten all parts associated with inlet manifold, including vacuum advance ● (pp. 185 and 197)
	Insufficient fuel, or water in fuel	Clean as necessary ● (pp. 187, 191 and 192)
	Carburettor flooding	Clean needle valve. Check float level ● (pp. 187 and 193)
	Exhaust system restricted	Repair exhaust system ● (p. 260)
Engine has less power	Ignition timing incorrect	Adjust ● (p. 200)
	Distributor automatic advance incorrect	Repair and adjust as necessary ● (p. 197)
	Intake vacuum leaks	Tighten all parts associated with inlet manifold ● (p. 185)
	Valve clearances incorrect	Adjust clearances ● (p. 181)
	Engine compression low	Check compression ■
	Fuel starvation	Check supply, carburettor jets and needle valve ● (p. 193)
Engine stops when vehicle is brought to a halt. Otherwise performs normally	Throttle linkage out of adjustment	Check full throttle at pedal is full throttle at carburettor ■
	Throttle-setting screw needs adjustment	Adjust to increase idling speed ● (pp. 188 and 190)
	Pilot air jet blocked	Clean ● (p. 187)
	Inlet manifold vacuum leaks	Check all parts associated with inlet manifold, including vacuum advance ● (pp. 185 and 187)

Engine performance (contd)

Symptom	Fault	Remedy
Engine 'runs on' when switched off	Engine overheating	Check static timing, cooling system, carburettor adjustment, fan-belt tension and thermostat ● (pp. 186, 200 and 204-6)
	Spark-plug overheating	Check that correct grade of plug is fitted ● (p. 202)
	'Hot spots' inside combustion chamber	Decarbonise ● (p. 182)
	Valve clearances incorrect	Check and adjust clearances ● (p. 181)
	Vacuum leak	Tighten all parts associated with inlet manifold ● (p. 185)
Engine 'pinks'	Wrong fuel	Fill with correct grade ●
	Ignition timing too far advanced	Retime static advance ● (p. 200)
	Centrifugal automatic advance faulty	Check bob-weight springs ● (p. 197)
	Engine overheating	Check cooling system ● (pp. 204-7)
	Spark-plug overheating	Check that correct grade of plug is fitted ● (p. 202)
	Excessive deposits in combustion chamber	Decarbonise ● (p. 182)
Water drips from exhaust tail-pipe—after cold start	No fault: normal in cold weather	No action
Water drips from exhaust tail-pipe—at normal temperature	Cylinder-head gasket blown	Replace ● (p. 185)
	Cracked or warped cylinder head	Machine the head face ■
Engine misses at high speed	Dirty or loose electrical connections in ignition system	Check all connections, especially those at the distributor and coil. Clean, tighten and check condition of leads, especially carbon-cored plug leads. Check that rivets holding connectors to the coil are tight ● (pp. 194 and 196)
	Contact-breaker points dirty or burnt—or gap wrongly set	Check and correct the condition of the points and reset clearances if necessary ● (p. 199)
	Spark-plugs faulty	Clean, adjust or replace ● (p. 202)
	Dirt in carburettor	Clean ● (p. 186)
	Valve clearances incorrect	Check and reset clearances ● (p. 181)
	Air cleaner dirty	Clean or replace as necessary ● (p. 186)
Engine coughs and splutters continuously	Water or dirt in petrol feed system	Clean carburettor, filter and possibly whole system ● (p. 186)
	Low fuel level in carburettor	Adjust float level ■
Engine coughs and splutters irregularly, often backfiring	Fuel starvation	Electric pump: clean points and connections, ensuring good earth and that air can enter the fuel tank (check tank breather). If unsuccessful, replace pump ● (p. 191). Mechanical pump: clean out pump and filters. Check for air leaks in fuel-tank side of the pump ● (p. 192)

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Fault finding

	Symptom	Fault	Remedy	
Engine performance (contd)	Engine coughs and splutters irregularly, often backfiring (contd)	Water in petrol	Clean carburettor and possibly whole fuel system ● (p. 186)	
	Engine falters, picks up and finally stops; possible backfiring	Lack of petrol	Fill tank or check fuel system ● (p. 192)	
	Engine falters and stops when hot, but restarts	Vaporisation in fuel pipeline	Allow time for pump and pipeline to cool before attempting to restart ●	
	Engine does not appear to reach normal operating temperature	Thermostat defective or of incorrect heat range	Fit new thermostat of specified heat range ● (p. 205)	
		Defective temperature sensing unit	Replace ● (p. 205)	
Faulty temperature gauge		Replace temperature gauge or bulb ■		
Cooling system	Engine overheats	Lack of coolant	Check for leaks and lack of coolant, but allow half an hour to cool before filling up ●	
		Loose fan belt	Adjust belt tension to specification. Replace defective belt(s) ● (p. 206)	
		Cooling-system hoses defective	Replace defective hoses ● (p. 204)	
		Defective or wrong radiator pressure cap	Check that the radiator cap's rubber seal is in good condition and that the cap is of specified pressure rating. If not, fit one of the correct type ●	
		Cooling system clogged	Flush the cooling system ● (p. 204)	
		Thermostat defective	Replace defective thermostat with one of specified heat range ● (p. 205)	
		Ignition timing incorrect	Adjust to specification ● (p. 200)	
		Water pump faulty or leaking	Fit new or reconditioned water pump ● (p. 207)	
		Defective pressure bottle pipe (where fitted)	Check pipe for breaks and loose union connections ●	
		Air passages through radiator blocked, particularly on transverse engines	Clear passages by using grease dissolver and water. Do not scrape in any way ● (p. 236)	
		Thermostatically controlled fans faulty	Seek expert help ■	
		Distributor automatic advance incorrect	Remove restriction, or repair or tighten connections in vacuum line ● (p. 197). Replace worn or damaged parts. Adjust distributor advance to specifications ■	
		Overheating and steaming soon after starting on cold morning	Coolant frozen	Stop the engine. Wait for radiator to be warmed by conducted heat. Use stronger antifreeze solution ●
		Loud screech when engine is started cold	Fan belt slipping because of frozen water pump	Stop the engine. Move the car to a warm place and allow the ice to thaw ●
Fan belt loose	Adjust ● (p. 206)			

	Symptom	Fault	Remedy
Cooling system (contd)	Loud screech when engine is started cold (contd)	Water-pump bearings require lubrication	If there is no external lubricating point, use a water additive recommended by manufacturer ●
		Generator bearings require lubrication	Add a drop or two of light oil ● (p. 232)
		Power-steering fault	Seek expert help ■
	Leaks from water pump	Worn seal	Fit new pump ● (p. 207)
	Continuous bubbling and overheating	Blown gasket or cracked cylinder head	Check for distortion or fit new gasket ● (p. 185)
Radiator continually requires water	External leakage. (Rust stains usually show where.)	Check and replace hoses, core plugs and cylinder-head gasket as necessary ● (pp. 185 and 204)	
	Leakage into engine	Check dipstick for unusually high level and drops of water in engine oil. In bad cases, the oil will become white in colour. Check for excessive steam in the exhaust emission ●	
Car heating system	Car heater remains cool	Insufficient flow to heater	Check heater water-flow valve. Bleed the system ● (p. 205)
		Thermostat stuck in open position	Fit new thermostat ● (p. 205)
		Heater element partly blocked	Remove heater pipes where they join the engine. With the heater tap turned on, flush in both directions ● (p. 205)
Car heater suddenly goes cold	Defective fan belt	Replace the fan belt ● (p. 206)	
Battery	Low specific gravity readings, taken with hydrometer	Low state of charge	Check battery and charging system. Recharge battery ● and cure any faults in charging system or wiring ■ (p. 195)
		Loss of acid through leaks	Top leak can be sealed ■. If leak is at side, replace battery ●
		Loss of acid by overfilling	Take battery to specialist. Never add acid ■
		Defective battery	Fit new battery ●
	Low current capacity tested with heavy discharge tester	Low state of charge	Check specific gravity. Recharge ● (p.195)
		Defective cell	Plates can be replaced ■; but preferable to renew battery ●
	Although electrical system appears to be in good order, there is great difficulty in turning engine in cold weather	Battery too small for vehicle demands	Fit new battery of the correct, or greater, amp./hour rating. Seek expert advice ■
Fuel system	Engine uses too much petrol	Carburettor needs adjusting	Adjust carburettor ● (pp. 202 to 206)▲

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Fault finding

	Symptom	Fault	Remedy
Fuel system (contd)	Engine uses too much petrol (<i>contd</i>)	Air intake restricted	Replace air-cleaner element ● (p. 186)
		Choke stuck in operation	Check choke action ● (p. 193)
	Engine spits back or backfires when pulling	Fuel starvation or water in fuel	Clean carburettor jets and needle valve. Check fuel supply and fuel tank ● (p. 187) ▲
		Air leak in inlet manifold	Tighten all parts associated with inlet manifold ● (p. 185)
		Faulty ignition timing	Check timing ● (p. 200)
Lubrication	Engine needs frequent topping up with oil—blue smoke emitted from exhaust	Wear in cylinders, piston rings or valve guides	Seek expert advice, as it may be far cheaper and not particularly detrimental to tolerate condition until eventual engine change ■
		Oil leaks	Clean engine thoroughly. Run engine (hot) and look for leaks. Replace or tighten gaskets as necessary ● (p. 185)
	Engine needs frequent topping up with oil—exhaust normal	Engine breather blockage	Clean ■
		Excessive crankcase pressure	As this is caused by piston blow-by, seek advice ■. Repair may not be necessary.
Warning instruments	Oil warning-light does not go out	Lack of oil	Check oil level ●
		Oil warning-light faulty or pressure failure	Remove wire from oil warning-light switch on side of the engine. If the light stays on, there is a fault in the wiring ■. If it goes out, there is a fault in the oil-pressure switch or high-pressure system. Seek expert advice before restarting ■
		Engine oil-pressure system faulty	Take car to garage ■
	Oil warning-light comes on when cornering	Low oil level	Top up ●
		Inadequate oil pressure at low speeds	If correct grade of oil has been used, seek expert advice ■
	Oil warning-light goes out only when engine is speeded up	Not enough oil	Check level ●
	Oil-pressure gauge reading fails to rise when engine is started from cold	Fault in pressure system	Stop engine and consult expert ■
		Low oil level	Check for leaks, repair and top up. Drive carefully and recheck ●
	Oil reading falls suddenly during normal driving	Fault in pressure system	Stop engine. Do not restart. Seek expert advice ■
		Broken fan belt	Fit new belt ● (p. 206)
Ignition warning-light stays on when engine runs at speeds above tick-over	No generator output	Check commutator and brushes. If melted solder can be seen on looking into end of generator, a replacement generator and control box are required ■	
	No generator output (but generator appears to be working)	Check control-box earth ● (p. 227). All further tests should be made by a skilled vehicle electrician ■	

Symptom	Fault	Remedy	
Warning instruments (contd)	Ignition warning-light stays on when engine runs at speeds above tick-over (contd)	No generator output (when alternator is fitted)	If there are no obvious disconnected leads, seek expert help. ■ Leads which have been disconnected must not be reconnected while the engine is running ●
	Transmission	Car vibrates when driving or coasting	Wheels loose, buckled or out of balance. Wheel-balance problems will normally be identified by periods of vibration at certain speeds
Damaged or incorrectly fitted tyres		Fit new tyres ■	
Loose or worn universal joints. Propeller shaft or drive shaft may also be damaged		Replace immediately ■	
Fan blade broken		Fit new fan blade ● (p. 207)	
Front-wheel bearing failure		Fit new bearings ■	
Engine runs, but car does not move when in gear (if propeller shaft turns)	Broken half-shaft or half-shaft key	Seek assistance; car may require lift tow ■	
	Rear axle failure	Seek assistance; car will require lift tow ■	
Engine runs but car does not move when in gear (if propeller shaft does not turn)	Clutch slipping or failed	Check for correct free-play ● (p. 210). If in doubt, allow $\frac{1}{8}$ in. at point of adjustment and seek advice ■	
	Automatic gearbox faulty	Check automatic gearbox oil level in the way recommended in the car handbook. If correct, seek advice ■	
Difficulty in engaging gear	Tick-over too fast	Adjust ● (pp. 188 and 190)	
	Clutch does not disengage fully	Check that there is not too much free-play; that when the pedal is depressed, the activating lever on the side of the clutch housing is moved by the linkage, cable or hydraulic action. If linkage or cable is broken, replace. If the hydraulic system is empty, fill the reservoir and bleed the system ● (p. 210)	
	Pressure-plate out of adjustment, causing centre-plate drag	Replace clutch assembly ■	
	Broken or damaged centre-plate	Replace clutch assembly ■	
	Difficulty in engaging gear after vehicle has been stored	Centre-plate stuck to flywheel or seized on spigot-shaft splines	Jack up a driving wheel, start engine in gear, press clutch pedal and apply brake ● If not successful, clutch will have to be dismantled and freed ■
Clutch slips		Faulty adjustment	Adjust to recommended clearances ● (p. 210)
	Oil or grease on linings	Replace clutch unit. Find oil source and repair ■	
	Clutch worn out	If the clearance is correct, replace the clutch ■	
Clutch judders	Pressure-plate out of adjustment	Replace clutch unit ■	
	Engine mountings broken or too soft	Renew mountings ■	

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Symptom	Fault	Remedy	
Transmission (contd)	Clutch judders (contd)	Engine tie-rod (if fitted) out of adjustment	If broken, adjust or replace ■
	Clutch is noisy when pedal is fully released with engine running	Clutch linkage wrongly adjusted	Adjust free-play ● (p. 210)
	Clutch noisy when pedal is depressed	Clutch-release bearing worn or damaged	Replace bearing ■
		Flywheel-spigot bearing dry	If particularly annoying, lubricate or replace (which entails stripping the clutch) ■
	Noise (thud) when clutch is released—engine running and transmission in gear	Free-play in rear axle	Seek advice. This is often found in older cars, but is not necessarily serious or worth correcting
	Clutch pedal will not come all the way back	Fault in linkage	Adjust as necessary ● (p. 210)
	Gear lever rattles or makes buzzing noise	Gear-stick loose	Check and tighten ■
		Gear-stick damper loose or missing	Check, tighten or replace ■
		Gear-stick ball and socket over-lubricated	Remove, dry ball and socket, lubricate sparingly and replace ■
		Remote-control linkage worn	Fit new parts as necessary ■
Gear-grinding noise during engagement (car not moving)	Engine idling too fast	Adjust as required ● (pp. 188 and 190)	
Grinding noise during gear changes	Synchromesh worn	Seek advice ■	
	Worn gearbox bearings	Seek advice ■	
	Clutch not operating correctly	Change clutch ■	
Gear slips out of engagement	Worn gearbox	Seek advice ■	
	Worn engine/gearbox mountings, allowing engine movement to knock out of gear	Replace mountings, torque-reaction struts or rubbers ■	
Transmission noisy in forward gears	Lubricant level low	Top up ● (pp. 210–11)	
	Transmission misaligned	Align and tighten bolts ■	
	Transmission internal component(s) worn, broken or damaged	Repair or replace defective parts ■	
Transmission noisy in reverse	Reverse idler-gear or shaft worn or damaged	Replace defective part(s) ■	
Transmission sticks in gear	Lubricant level wrong	Fill according to car handbook ● (p. 209)	

	Symptom	Fault	Remedy
Transmission (contd)	Transmission sticks in gear (contd)	Gear-selector linkage not operating properly	Free or replace parts as required ■
		Internal gearbox fault	Seek advice ■
	Little or no increase in vehicle speed when accelerator is pressed, although engine rpm increases	Clutch slipping	Adjust free-play. If it is correct, the clutch is worn out. To continue journey, do not induce slip ● (p. 210)
Braking system	Brakes judder	Loose mountings, worn or faulty drums or discs	Check and tighten back-plate, spring U-bolts, and worn swivel pins and bushes. Replace drums or discs as necessary ■
		Brake linings damaged	Renew brake linings ● (pp. 214-17)
	Vehicle pulls to one side	One tyre under-inflated	Check tyre pressures ● (p. 218)
		Unequal brake adjustment	Adjust all brakes ● (p. 212)
		Oil on linings on side opposite to the pull	Fit new oil seals ■
		Seized wheel-cylinder piston on side opposite to the pull	Free piston or replace complete cylinder ■
	Too much pedal travel before brakes operate	Brake shoes need adjusting or replacing	Adjust shoes. If worn, replace ● (pp. 212 and 214)
		Master-cylinder push-rod has excessive clearance	Adjust ■
	Vibration felt on pedal when pressure is applied	Cracked or warped brake drums. Discs out of true	Replace ● (pp. 214-17)
	Pedal feels 'spongy'	Brakes not properly bled—air in system	Bleed system ● (p. 213)
New brake shoes not run in		Condition will improve with use	
Pedal can only be applied by 'pumping'	Air in system	Bleed and adjust brakes ● (pp. 212-13)	
	Master-cylinder fault	Replace master cylinder or rubbers ■	
	Slight leak in system	Trace and cure ■	
More effort than usual required to operate the brakes	Brake linings worn	Replace ● (p. 214)	
	Seized wheel-cylinder units	Repair or replace ■	
	Servo, where fitted, not working	Check manifold-to-servo vacuum supply. If satisfactory, put a hand on the servo; if operation cannot be felt when the brakes are applied and the engine is running, seek advice ■	
	Wrong linings	Replace with manufacturer's exchange unit ● (pp. 214-15)	
Brakes drag or fail to release	Shoes adjusted too close to drum (binding)	Re-adjust ● (p. 212)	
	Air hole in reservoir cap blocked	Use pin to clear cap hole ●	
	Wheel-cylinder piston seized	Replace or free ■	
	Handbrake cables seized	Clean, lubricate and check action ● (p. 212)	
	Shoe-return springs weak or broken	Replace ● (p. 214)	

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Braking system (contd)	Brakes drag or fail to release (contd)	Adjustment of push-rod from pedal to master-cylinder	Re-adjust to give free play at pedal before rod contacts master-cylinder piston ■
		Hydraulic cylinder cups swollen	Wrong fluid in system. Drain and replace all cups and fill with new fluid ■
	Brakes grab	Shoes faulty	Inspect shoes and linings. If not worn to replacement level, chamfer leading edges to prevent grabbing. Fit new return springs ● (p. 214)
		Distorted or cracked drums or discs	Replace ● (pp. 214-17)
	Brakes overheating or smoking	Shoes binding	Re-adjust shoes ● (p. 212)
		Prolonged use of brakes during steep descent, fast driving or towing	Stop and allow to cool as often as possible ●
Brakes suddenly fail	Broken brake pipe or leak	Consult garage ■	
Suspension	Car low at front	Tyre pressure wrong	Inflate to correct pressure ● (p. 218)
		Broken spring(s)	Replace broken spring(s) ■
		Weak spring(s)	Replace the front springs if the front-wheel riding height is below specification ■
		Weak or defective damper spring unit(s)	Replace ■
		Hydraulic or compressed gas unit leak	Seek advice ■
	Car low at rear	Tyre pressure wrong	Inflate to correct pressure ● (p. 218)
		Vehicle is overloaded at rear	Distribute weight evenly ●
		Broken spring(s)	Replace broken spring(s) ■
		Weak spring(s)	Replace the rear springs if the rear-wheel riding height is below specification ■
	Car low at one wheel	Weak or defective damper spring unit(s)	Check and replace ■
		Tyre pressure wrong	Inflate to correct pressure ● (p. 218)
		Car unevenly loaded	Distribute weight evenly ●
		Broken spring	Replace spring ■
		Weak spring	Replace spring ■
	Car tilts to one side	Worn or damaged suspension parts	Replace all suspension arms and bushes that are worn or damaged ■
Hydragas or Hydralastic pressure wrong		Check pressure and increase as required ■	
Chassis damaged or broken		Check alignment and repair ■	
Weak or defective damper spring unit(s)		Check and replace ■	
Hard or rough ride	Tyre pressure wrong	Check tyre pressure ● (p. 218)	
	Vehicle overloaded or unevenly loaded	Distribute weight evenly ●	

	Symptom	Fault	Remedy
Suspension (contd)	Hard or rough ride (contd)	Out-of-round tyre	Replace tyre ■
		Loose or defective damper unit(s)	Tighten or replace ■
		Broken spring	Replace spring ■
		Seized suspension parts	Lubricate or replace ● (p. 222)
		Car sways	Loose or defective damper unit(s)
		Broken spring	Replace spring ■
		Weak spring	Replace spring ■
		Loose or broken anti-roll bar	Seek help ■
		Roof-rack overloaded	Unload: use roof-rack for bulky but not heavy items ●
Steering	Car wanders	Tyre pressure wrong	Inflate to correct pressure ● (p. 218)
		Car overloaded or unevenly loaded	Distribute weight evenly ●
		Loose, worn or damaged steering linkage or connections	Replace parts where necessary ■
		Incorrect front-wheel alignment	Adjust wheel alignment to specification ■
		Loose steering box	Tighten box attachment or replace if housing is broken ■
		Broken spring	Replace spring ■
		Weak spring	Replace spring ■
		Incorrect front-wheel bearing adjustment	Adjust wheel bearings to specification ■
		Incorrect steering-box adjustment	Adjust to specification ■
		Steering hard to turn	
Not enough lubrication	Grease as recommended. Top up oil in steering box ● (p. 224)		
Steering-gear adjustment wrong	Adjust ■		
Front-wheel alignment wrong	Adjust wheel alignment to specification ■		
Damaged steering box	Overhaul or replace ■		
Play in steering		Loose, worn or damaged steering linkage or connections	Replace parts as necessary ■
		Loose steering-box mounting	Tighten box attachment or replace if housing is cracked ■
		Steering-box adjustment wrong	Adjust to specification ■
		Suspension ball-joints or king-pins worn	Replace as necessary ■
Car pulls to one side		Tyre pressure wrong	Inflate to correct pressure ● (p. 218)
		Tyres on front wheels in different states of wear	Seek expert help ■
		Brakes binding	Adjust or repair as necessary ● (pp. 212-17)

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 ■ indicates that the work is beyond the scope of all but the most experienced mechanics, and you should consult a garage
 ▲ indicates that on emission control carburettors, work must be done by a specialist

Fault finding

	Symptom	Fault	Remedy
Steering (contd)	Car pulls to one side (contd)	Broken spring	Replace spring ■
		Weak spring(s)	Replace spring(s) ■
		Front-wheel alignment wrong	Adjust wheel alignment ■
		Rear axle loose	Tighten rear suspension mountings and tie rods ■
Wheels and tyres	Tyre wear conditions	Front-wheel alignment wrong	Adjust alignment ■
		Wheels out of balance	Balance each wheel ■
		Buckled wheels	Renew ■
		Front-wheel bearing adjustment wrong	Adjust wheel bearings to specification ■
		Worn or damaged suspension components	Replace ■
		Loose, worn or damaged steering linkage or connections	Replace ■
Tyres show excess wear on edges of tread	Tyres under-inflated		Inflate to correct pressure ● (p. 218)
		Front-wheel alignment wrong	Adjust alignment ■
Tyres show excess wear in tread centre	Tyres over-inflated		Reduce tyre pressure to specification ● (p. 218)

Identifying engine noises

Engine noises often require explanation, if only for the motorist's peace of mind. Although some hints are given here, it is emphasised that they are only hints. The same fault in two different engines will not necessarily make the same sound. A simple way to hear engine noises, and often to pinpoint their source, is to use a long screwdriver as a stethoscope. But take care to avoid the engine fan and its driving belt if you have long hair, or are wearing a tie or loose clothing.

Light tapping	Tappets out of adjustment	
Persistent light tap after tappet adjustment	Worn cams, tappets or rocker arms	Check and adjust tappets ● (p. 181)
Persistent light tap, varying with engine load and speed	Worn small-end bush, piston slap or broken piston ring	Check and replace worn parts ■
Heavy knock varying with engine speed or engine load	Big-end bearings worn	Seek expert assistance ■
Rattle or grind when clutch is operated	Clutch-release bearing worn	Immediate workshop job to prevent further damage ■
Squeal or whine	Worn seals on water pump, or slack fan-belt	Remove gearbox and fit new clutch assembly ■
Hissing pop as throttle is opened	Exhaust leak at manifold flange, or damaged silencer	Check pump body for leaks; check fan-belt ● (p. 206)
Rattle noticeable during tick-over	Worn timing chain, or tensioner out of adjustment	Tighten or replace as necessary ● (pp. 260-1)
Hiss varying with engine speed	Air leak into inlet manifold	Re-adjust tensioner or fit new chain ■
		Check carburettor flange gasket ● (p. 187)

Symptom	Fault	Remedy	
Starter system	Starter motor does not turn and lights fail to operate	Battery flat	Recharge or replace ● (p. 195)
		Open circuit in line from battery	Clean and remake connections to the battery. If fault persists, check battery earth connection, and connection at starter solenoid terminal ● (pp. 195 and 230)
	Starter motor does not turn and lights go out	Poor connection at battery	Clean and remake connections to battery (as above) ● (p. 195)
	Starter motor does not turn and lights go very dim	Battery in too low a state of charge	Recharge or obtain replacement ● (p. 195)
		Starter-motor pinion jammed	Free the pinion ● (p. 230)
		Short-circuit in or at starter motor	Check that the lead to starter motor is not loose or touching a metal part. Otherwise, remove and repair or replace starter motor ● (pp. 230-1)
		Engine seized	Seek expert help ■
	Starter motor does not turn engine; lights go slightly dim	Pinion not engaging, although motor runs freely	Listen for sound of running motor to confirm diagnosis. Then remove motor, clean pinion and sleeve. Check for satisfactory operation and refit motor ● (p. 230)
	Starter motor does not turn; lights stay fully bright	Ignition key not operating circuit	Operate solenoid by hand, if possible ● (p. 230). If not, seek expert help ■
		Solenoid switch faulty or circuit open	Check and replace ● (p. 230)
Open circuit in starter motor		Tap the starter motor sharply and turn the armature a little as if to free pinion. Check connections, also motor commutator and brushes. If none of this works, replace starter motor ● (pp. 230-1)	
Solenoid switch chatters	Battery flat	Charge or push start ● (p. 195)	
Engine starts but starter fails to disengage, making a loud noise	Faulty ignition/starter switch	Disconnect solenoid activating wire from solenoid; start by manual button or push start. Fit new switch as soon as possible ■	
	Pinion jammed in mesh with flywheel gear teeth	Free the pinion. If the fault continues, remove the motor to inspect the pinion and the flywheel ring gear for damage. Replace if necessary ● (p. 230)	
DC generator system	The vehicle generator is meant to supply the correct charging rate at all times—that is, a high rate of charge for a discharged battery and a low rate for a fully charged battery. If an ammeter is fitted, it is possible to monitor the charging rate. If there is no ammeter, the only visual indication of a fault is the failure of the light to go out above idling speed. This will mean that the charging system has failed		
	Charge rate zero or too low	Drive-belt slipping or broken	Adjust or replace ● (p. 206)
		Poor connections or faulty leads	Clean and tighten connections on dynamo and control box ● (p. 232)
		Electrolyte level in battery very low	Top up with distilled water ● (p. 195)

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Fault finding

	Symptom	Fault	Remedy
Dynamo	Not charging	Sticking brushes	Remove brushes. Renew if worn, or clean them and their guides and refit in original positions ● (p. 233)
		Weak springs	If colour suggests springs have been very hot or if they are obviously worn or damaged, replace them ● (p. 233)
		Dirty commutator	Clean surface with petrol-moistened rag ● (p. 233)
		Burnt commutator	Polish surface by rotating commutator against a piece of fine glasspaper (not emery) ● (p. 233). If more drastic treatment is necessary to remove pitting, have the dynamo overhauled by a vehicle electrical specialist or fit a complete exchange unit ■
		Internal wiring defects	Consult vehicle electrician or fit replacement dynamo ■
	Erratic charging	Faulty control box or bad earth, indicated by an extra bright ignition warning-light (above tick-over) or a fluctuating ammeter reading	Check that the control box has a good earth ● (p. 227). Replace or have control box adjusted by vehicle electrician ■
	Fluctuating charging rate	Control box defective	Have control box tested by vehicle electrician ■
Noisy dynamo	Loose mounting bolts or pulley		Check and tighten ● (p. 232)
		Worn bearings	Replace bearings or complete dynamo ■
An alternator can be damaged easily: any charging fault, apart from fan-belt adjustment or loose connections, should be left to a vehicle electrician			
AC generator (alternator)	Not charging	Loose or broken fan belt	Replace or adjust ● (p. 206)
		Loose connection	Check and tighten any loose or disconnected wires. The engine must not be running while connections are made or broken ● (p. 232)
Lighting system	All lamps fail to light	Poor connection at battery	Clean and remake ● (p. 195)
		Battery completely flat	Charge or replace ● (p. 195)
	All lamps fail when starter motor is operated or fail to light after starter has 'gone dead'	Arcing at poor battery-terminal connection has caused high resistance between terminal and cable clamp	Clean and remake battery connection(s) ● (p. 195)
	Lamps in series with main lighting switch fail	Switch defective	Using a lead with a clip at each end, short-circuit the input and output terminal of switch. If lamps light, switch is faulty and should be replaced. This test is not easy to make—if in doubt, seek expert help ■
		Feed-wire to switch disconnected or broken	Check and replace or reconnect ■
	Pair or set of lamps fail to light	Bad earth return	Make temporary earth with wire to test. Clean as necessary ● (p. 227)
		Faulty switch	Check and repair or replace ● (p. 226)
Connector or a feed-wire common to both lights has become defective		Trace wiring and repair. Check push connectors ● (p. 228)	
	Bulbs blown	Check and replace ● (p. 226)	

Symptom	Fault	Remedy
One lamp of a pair (or set) fails	Bulb blown	Check and replace ● (p. 226)
	Poor contact at bulbholder	Remove bulb, scrape contacts (in bulb cap and holder) to clean, then refit firmly ● (p. 226)
	Poor earth connection	Check. Clean point of connection and remake ● (p. 228)
	Broken feed wire to lamp or loose connector	Trace wiring and repair ● (p. 228)
All side and rear lights fail, but flashers and stoplights work	Fuse (often a line fuse) broken	Check handbook for location of fuse, and replace ● (p. 226)
An independent lamp (or accessory) fails	Fuse failed (if fitted)	Investigate cause and repair, then fit new fuse ● (p. 226)
	Same fault as when one lamp fails (above)	Remedies as above ● (pp. 226 and 228)
	Accessory fault	Repair or replace ● (p. 229)
	Faulty switch	Repair or replace ● (p. 229)
Panel lamp fails to light	Faulty switch	Repair or replace ● (p. 229)
	Faults as for independent lamp failing	Remedies as above ● (pp. 226, 228 and 229)
Interior lamp fails to operate ('on' or 'off') from door pillar switches	Bulb failed	Check and replace ● (p. 226)
	Poor contact with switch holder	Remove, scrape contacts and refit. This switch earths at its locating hole in the door jamb ● (p. 229)
	Defective wiring or connections	Check and repair ● (p. 228)
All lights dim when car is stationary or at low speed	Fan belt loose	Tighten ● (p. 206)
	Battery in low state of charge	Charge or replace ● (p. 195)
All lights dim even when car is running at moderate to high speeds	Fan belt loose	Check and tighten ● (p. 206)
	Generator output too low	Adjust control box ■
Poor illumination from one or more lamps	Excessive blackening of bulbs	Replace ● (p. 226)
	Bad earth	Check and clean ● (p. 227)
	Reflector tarnished	Renew light unit(s) ● (p. 256)
	Defective wiring or connection	Check and repair ● (p. 229)
Lights flicker or increase appreciably in brilliance when generator is charging the battery	Defective or flat battery	Replace or charge ● (p. 195)
	Fan belt loose	Tighten ● (p. 206)
	Excessive load on battery (i.e., too many accessories)	If possible, remove some of the load ●
	Bad earth	Check and clean control-box earth ● (p. 227)
	Faulty control box	Replace, or seek help from vehicle electrician ■

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Fault finding

Symptom	Fault	Remedy
Lighting system (contd)	Bulbs blacken frequently or keep blowing	Excessive generator voltage (assuming correct-voltage bulb)
	Accessories	All accessories on the same fuse fail to operate
Direction indicators		Completely inoperative
	Circuit between power supply and fuse defective	
	Fuse blown, or dirty fuse or holder	
	Faulty flasher unit	
Warning lamp not flashing (flasher unit not clicking)	Set of indicator bulbs on one side of vehicle not working	Faulty wire between power supply, via fuse, to flasher unit; or faulty connections
		Faulty cable or connections between flasher unit and direction-indicator switch
		System completely inoperative
		Warning light or one indicator bulb not working
Increased rate of flashing of indicator lamps and warning lamp	Fault in flasher unit or wrong type for vehicle	
Heater blower	Blower unit inoperative	Repairs to most heater blowers are impractical: it is usually wiser to replace the unit. However, some minor jobs can be done
		Fuse blown
		Loose connections or broken wires
		Faulty switch
Windscreen wipers	Failure to operate	Electrical failure in motor
		Fuse blown
		Connections and wiring faulty
		Faulty switch
		Mechanical drive seized
	Faulty motor	

Remedy

Control-box fault: seek help from vehicle electrician ■

Clean fuse holder if fuse is serviceable. Switch everything off, including ignition switch, and fit replacement fuse. Switch on ignition and note if fuse blows again. If so, there is a 'short' in a circuit that receives power without the need of another switch. If fuse does not blow, switch on each accessory branch until the fuse blows, thus indicating the faulty branch. Inspect closely for defective accessory or wiring. Repair ● (p. 226). If in doubt, seek expert help ■

Check by by-passing switch, using a lead ■

Trace wire, check and repair ■

As for when all accessories fail ● (p. 226) ■

Check and replace ● (p. 229)

Check and repair ■

Check and repair ■

Check bulbs and wiring connections. Rectify as necessary. Check indicator switch ● (p. 227)

See checks under 'Completely inoperative' section above

Check whether bulb is blown, wiring connections are defective, or if there is a bad earth. Repair as necessary ● (p. 227)

Check and replace if necessary ● (p. 229)

Investigate and replace ● (p. 226)

Check (including earth) and repair ● (p. 227)

Check by short-circuiting switch, using a lead with a clip on each end. Fit replacement switch ● (p. 227)

Fit new blower unit unless motor is accessible for servicing ■

Investigate and replace ● (p. 226)

Check and repair ● (p. 228)

Check by by-passing, replace if necessary ● (p. 227)

Seek expert help ■

Fit new motor, or dismantle and replace defective part (e.g., brushes, armature, etc.). In either case, follow manufacturer's instructions ●. If in doubt, seek expert help