

INTRODUCED in May 1962, the Austin Freeway represents the first bid by B.M.C. Australia to design a six-cylinder family car specifically for this country.

It is not manufactured anywhere else and has no six-cylinder counterpart in Britain.

Along with the Freeway, B.M.C. also introduced the Wolseley 24/80, which adds many luxury features but shares the same mechanical specifications. Advice given in this article applies to both cars.

Power-plant is the Australian-developed "Blue Streak Six" — an o.h.v. unit embodying well-proven design

features, such as an all-valves-in-line layout, twin duplex timing chains, counterbalanced crankshaft, slipper-type bearing shells, detachable camshaft bearings, oil seals on valve stems, and so on.

Main and big-end bearings are the lead-bronze type and are tin-overplated, to protect the shaft in the event of an oil supply failure. Using a 3in. bore and 3½in. stroke, the engine makes no concessions to the current "oversquare" fashion — and while its peak output of 80 b.h.p. is reached at 4350 r.p.m., the maximum of 123lb./ft. comes in at only 1650 revs. The design results in healthy

KNOW YOUR AUSTIN FREEWAY

(and Wolseley 24/80)

acceleration, combined with flexibility and generous pulling power.

Engine Removal

It's best to remove the engine together with the gearbox—and one unusual feature is that the front suspension is detached at the same time.

First drain the cooling water from two taps (one on the engine block, one on the radiator). Disconnect and remove battery, then radiator hoses and the heater hoses (at bulkhead).

Disconnect condenser lead from distributor, the high-tension and switch wires from coil, the spark-plug cables from the plugs. Take off distributor cap and slip the rotor off the shaft.

Remove generator lead, then disconnect starter cable at the motor end. Disconnect oil-pressure pipe from right-hand side of engine, also water-temperature cable from cylinder-head. Disconnect choke cable and fuel pipe from carburettor.

Unbolt exhaust pipe at manifold; then, working from below, take out the clevis pin securing the clutch-operating lever to operating cylinder, remove two set-screws holding cylinder to housing and detach cylinder.

Remove control rod from levers to the gearbox and disconnect earth strap at body end. Disconnect speedo cable from the gearbox, then remove tailshaft. Mark shaft first for correct return of parts to their original positions and secure the two wing bearings so they won't drop out of the universal cross. Plug the gearbox extension to prevent oil loss.

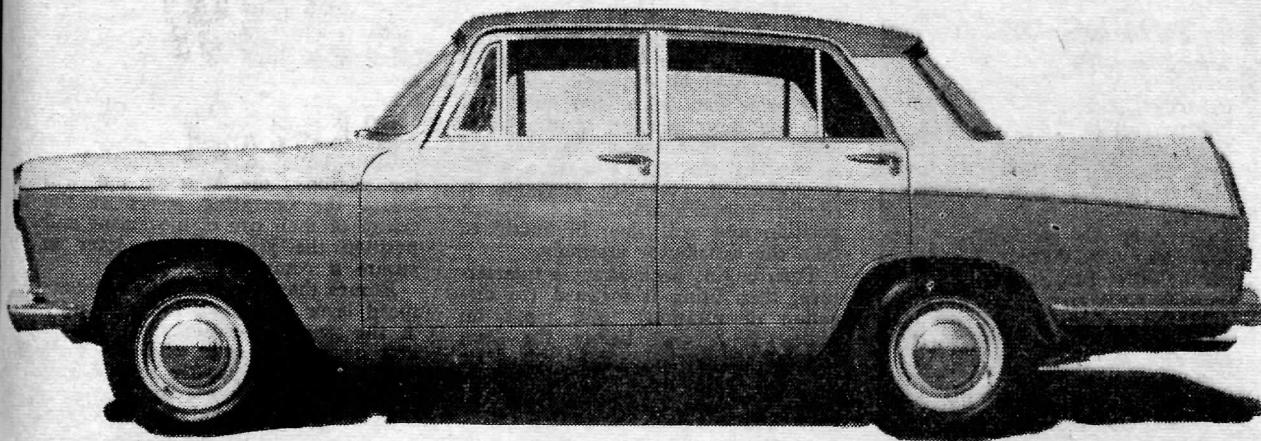
At the front end, remove hydraulic brake pipes from their connections at wing valance and the steering drag links from their respective levers.

Place a trolley jack under centre of gearbox and raise it enough to take the weight, then remove the front body cross-member just below the harmonic balancer. The engine and front suspension complete can now be freed by removing the four nuts,

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FAULT-FINDING CHART

- If engine will not start and starter will not crank engine, check for:
 - (a) Run-down battery
 - (b) Cable corroded or disconnected
 - (c) Faulty starter switch
 - (d) Dirty starter-drive assembly
 - (e) Broken drive spring
 - (f) Defective starter motor
- If the starter cranks the engine slowly but the engine will not start, check for:
 - (a) Loose terminals
 - (b) Dirty connections
 - (c) Battery charge low
 - (d) Faulty starter motor
- If the engine will not start and there is no spark at the plug gaps, check for oiled-up plugs or cracked porcelain.
- If there is no spark at the distributor plug leads, check for:
 - (a) Cracked rotor
 - (b) Loose low-tension wires
 - (c) Faulty cap
 - (d) Worn or dirty breaker points
 - (e) Faulty carbon-brush contact
 - (f) Defective condenser or connections
- If the ignition system is in order, check the fuel system; if there is no fuel in the carburettor, test for:
 - (a) Air leaks in the petrol line
 - (b) Blocked vent in petrol-tank cap
 - (c) Choked filters in carburettor or fuel pump
 - (d) Blockage in the fuel pipe
 - (e) A faulty fuel pump
- If petrol is present but the trouble still seems to be due to a fuel fault, check for:
 - (a) Choked jets
 - (b) Defective starting control (choke)
 - (c) Air leak in induction manifold
 - (d) Water or dirt in the fuel
- If the engine misfires or runs imperfectly, it may be due to ignition defects as follows:
 - (a) High-tension leads shorting
 - (b) Distributor points not properly adjusted
 - (c) Defective or damp distributor cap
 - (d) Ignition timing incorrect
 - (e) Faulty condenser
 - (f) Cracked spark-plug porcelain, dirty or improperly gapped spark plugs
 - (g) Loose battery connection
- If ignition is not the cause of misfiring, check the fuel system for:
 - (a) Partly blocked fuel line or pump filter
 - (b) Float needle valve dirty or faulty
 - (c) Water in the carburettor
 - (d) Low pump pressure
 - (e) Carburettor flooding
 - (f) Weak mixture
 - (g) Blocked vent in petrol-tank cap
- Some mechanical factors which can cause misfiring or faulty running are:
 - (a) Excessive carbon deposit
 - (b) Sticking, burnt or broken valves
 - (c) Broken or weak valve springs
 - (d) Improper valve clearances
- If the engine starts and stops, check for:
 - (a) Loose connections in the low-tension circuit
 - (b) Faulty contact in the ignition switch
 - (c) Dirty contact points
 - (d) Defective condenser
- If this trouble is not due to faulty ignition, check for:
 - (a) Blocked fuel line
 - (b) Water or dirt in the fuel
 - (c) Lack of petrol
 - (d) Faulty fuel pump
 - (e) Air leaks in manifold system
 - (f) Sticking needle valve.
- If the engine will not give full power, check for:
 - (a) Valves burnt or not seating properly
 - (b) Ignition retarded
 - (c) Automatic advance defective
 - (d) Defective high-tension leads or spark plugs
 - (e) Faulty distributor cap
 - (f) Insufficient fuel supply
 - (g) Air leaks in manifold system
 - (h) Jets partly blocked



spring washers and rubber packing pieces at the front and rear of the suspension assembly (two each side).

Lever the change cross-shaft assembly towards the motor and release it from the socket on the bulkhead. Remove the set-screws securing the gearbox cross-member to frame (three each side), then attach suitable lifting tackle to the front of the car and raise the latter until it clears the engine, gearbox and front suspension.

The power assembly will now be resting on the front wheels and the jack, and you will be able to roll it clear of body.

Dropping the Sump

Pistons and rings can be overhauled without removing engine from body — it's only necessary to take off the cylinder head and remove the sump and oil-strainer.

Warm up the engine, then place a container that will hold at least 10 pints under the sump and undo drain-plug. Remove dipstick, place a jack (with a piece of wood interposed) under the centre of the power unit to take the weight, and remove the four front mounting bolts on each side—also the nuts from the four bolts holding the front suspension cross-member to the body.

Using a suitable lifting sling, raise front of car until you get a clearance of at least 4in. between sump and cross-member (take care not to strain the flexible brake hoses).

The 25 set-screws holding the sump must be undone gradually and

progressively. Carefully lower the sump to clear the oil-strainer and withdraw it from underneath the vehicle. By undoing three bolts, you can remove strainer from oil pump.

Before replacing sump, see that all parts are clean and free from scores or burrs, and clean the oil-strainer with a brush and kerosene. Fit a new sump gasket — also a new copper washer under the drain-plug.

Pistons, Rods, Rings

Pistons and rods are withdrawn from the top of the cylinder block; after removing each assembly, replace the big-end cap and bearing exactly as before.

Although rods and caps are marked, this ensures only that they are paired properly. It's a good plan to mark them also in such a way that they can be returned to their own cylinder bores.

To remove a piston from its conrod, use special pads, or else bolts shaped so that they enable you to clamp the gudgeon-pin in a vice without putting any pressure on the piston. The bolts should be small enough in the shank to slide into the bore of the gudgeon-pin, and their hexagon heads should be ground round, to ensure they do not foul the piston boss.

Once the bolt-heads are gripped in the vice, they will hold the gudgeon firmly between them, and you will be able to undo the clamp bolt holding the small-end to the gudgeon without straining or twisting the rod.

Never refit a top ring other than as it came from the piston, unless the ridge at the top of the bore is first removed (assuming, of course, that a ridge has been worn in the cylinder wall). To turn the top ring upside-down, or fit a new ring without removing the ridge, is to invite disaster. As the ring edge hits the ridge, the impact is liable to break the ring, the piston land, or both—and it may even cause irreparable damage to the block.

Piston and rods are replaced in the reverse of the removal procedure. The ring gaps should be staggered away from each other so that the three gaps can never come into line and so allow gas to escape. The top ring gap should be set away from the exhaust valve. It is recommended that a ring-compressor be used to refit the pistons to their bores.

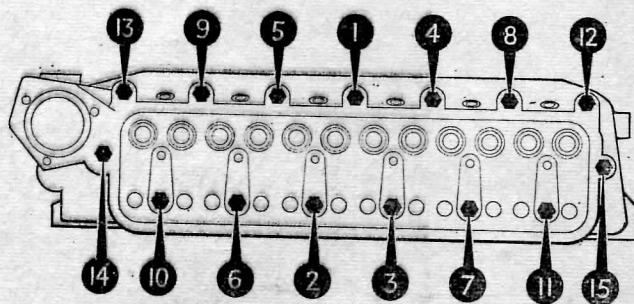
All pistons and rods must be the same way round—with the gudgeon-pin clamp on the camshaft side of the engine. As a check to correct assembly, the large offset of the big-end boss should be with 1 and 2 facing each other (similarly 3 and 4, and 5 and 6)—or else the short offset should point toward the nearest main bearing.

Valve Timing

Whenever the timing chain has to be removed, it's necessary to retime the valves. Set the crankshaft so that its keyway is at top dead centre and the camshaft keyway at about 1 o'clock when viewed from the front, then assemble the wheels to the chain so that the two timing marks or "dimples" are opposite each other.

Keeping the wheels in this position, engage the crankshaft wheel keyway with its key, rotate the camshaft until its key and keyway are aligned, then push the gears home on their respective keys and secure the camshaft wheel with the lock washer and nut.

If the chain tensioner has been removed from the engine, replace the backplate and secure the assembly to the block.



TIGHTEN head nuts in this sequence.

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maintenance
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TUNING DATA

Bore: 3.00in.
 Stroke: 3.50in.
 Capacity: 2433c.c.
 Firing order: 1, 5, 3, 6, 2, 4.
 Compression ratio: 7.7:1.
 Max. b.h.p.: 80 at 4350 r.p.m.
 Max torque: 123 lb./ft. at 1650 r.p.m.
 Points gap: .014 to .016in.
 Spark-plug gap: .025in.
 Battery: 12v., positive earth.

VALVES

Valve timing (with .021in. rocker clearance for check only):
 Inlet opens at T.D.C.
 Inlet closes 50deg. A.B.D.C.
 Exhaust opens 35 deg. B.B.D.C.
 Exhaust closes 15 deg. A.T.D.C.
 Rocker clearance for running: .015in.
 Seat angles: 45 deg. (all).
 Spring free length: 2-1/32in.
 Fitting length: 1-17/32in.

TENSIONS

Cylinder-head bolts: 40 ft./lb.
 Main-bearing nuts: 70 ft./lb.
 Conrod set-screws: 35 ft./lb.
 Gudgeon-pin clamp: 25 ft./lb.

FRONT END

Toe-in: 1/16 to 3/16 in.
 Castor angle: 1 1/2 deg.
 Camber angle: 3/4 to 1 deg.
 Kingpin inclination: 6 1/2 deg.

Ignition Timing

If the distributor drive gear has been removed, the whole of the ignition timing must be reset.

Turn engine until No. 1 piston is at TDC on its compression stroke (check by seeing that the valves on No. 6 cylinder are rocking—i.e., the exhaust just closing and the inlet just opening, at which point piston No. 1 should be at or about TDC compression).

Bring notch in crankshaft pulley in line with the longest pointer on

cover; screw a bolt 2 1/2 to 3in. long, with a 5/16th in. UNF thread, into the tapped hole of the distributor spindle; hold drive gear with the offset slot just below the horizontal and the large portion of the offset uppermost, then insert the gear. As it meshes, the slot will turn anti-clockwise; if correctly engaged, it should approximate the 1 o'clock position and will then be ready to take the distributor assembly.

Turn engine back about a quarter-turn, then bring it forward (in direction of rotation) until mark on pulley is 3 deg. before the long timing pointer. (To gauge this, bear in mind that the two short pointers are 5 and 10 deg. away from the long pointer, or before TDC.)

Making sure the engine is not turned again, set the contact points to .015in. gap at maximum opening, insert the distributor into its housing and engage the drive lugs with the driveshaft slots by slowly rotating the rotor arm.

Screw in the two bolts securing distributor clamp to housing, and position the distributor so that the vacuum control unit side of body is to the rear and the unit is vertical. Rotate distributor anti-clockwise until points are fully closed, then slowly turn it clockwise until the points just start to open. Secure distributor body in this position by tightening the clamp-plate pinch-bolt and nut.

Adjusting Gear Linkages

To ensure that there's no stiffness in the gear-change mechanism, it's essential to maintain correct free movement of the linkages.

One adjustment is provided on each rod at the gearbox change-speed levers. Remove the nut and spring washer from the ball pin and withdraw the pin from the lever. Then, after loosening the locknut on the adjusting rod, the ball-joint assembly may be turned up or down to vary the effective length of the rod. Before adjusting, ensure that the engine steady buffers are firmly clamped.

To adjust both rods, use an aligning pin 6in. long and of 3/16in. diameter. This must be placed through the recesses in the lower column mounting bracket and the holes provided in both operating levers (see fig. A).

With both rods disconnected at the gearbox, the aligning pin will locate the operating levers at the centre of their arc of movement and position the jaws of each lever to ensure a common "neutral."

Ensure the second and top change-speed lever (front) is locked rigidly in the neutral position by engaging first or reverse gear with the gear lever (fig. B). Adjust the second- and top-speed linkages so that the ball pin is fully engaged in the lever without "drag" on the aligning pin, then tighten the lock-nut.

Remove ball pin from lever, then follow same procedure with the rear lever in neutral and front lever in gear, adjusting the first and reverse linkage. Replace ball pins in change levers and lock-up with nuts and washer. Remove aligning pin from bracket and operating levers.

Gearbox Removal

The gearbox can be taken out without removing the engine.

Disconnect battery, choke, throttle linkage, fuel line at carburettor and exhaust pipe at manifold flange. Place vehicle on safety stands front and rear, and support engine with a block of wood and a jack.

Remove tailshaft, also the bolts in rear engine mounting cross-member. Drain gearbox oil, then remove shift linkages and speedo cable. Remove starter cable and motor, then the slave cylinder mounting bolts; tie the cylinder out of the way.

Remove the gearbox mounting bolts and support the box so that its weight will not hang on the clutch driven plate, as any distortion will ruin the latter. Lower the engine approximately 1 1/2in. and lift the gearbox towards the rear, until it clears the clutch assembly.

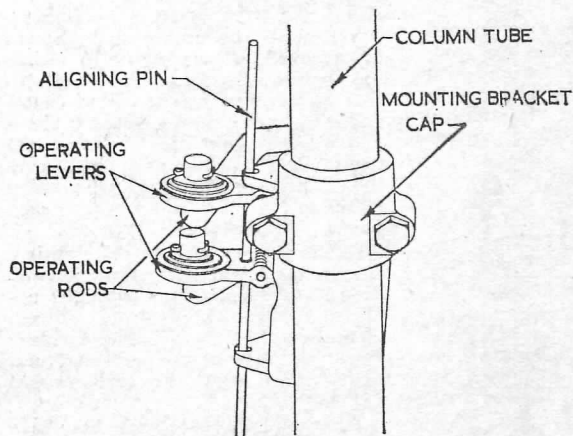


FIGURE A

Adjustments for correct free movement of gear linkages.

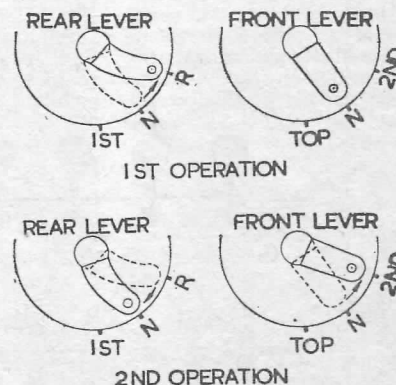


FIGURE B

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Safest method of removing the gearbox calls for the use of two to four pilot rods, screwed in to replace some of the mounting bolts. The rods must be long enough to support the box until the clutch shaft splines clear the plate nuts. They should be made of bright steel and oiled or greased before use, to enable the bell-housing to slide freely.

Clutch and Flywheel

The clutch pressure plate is removed by slackening the hexagon bolts which hold the assembly to the flywheel. It is best to unscrew these a turn at a time until the spring pressure is released.

The clutch cover is held by dowels to the flywheel, and a pair of centre-pop marks, on flywheel and cover plate, will ensure the unit is returned to its original position.

With clutch assembly removed, the six stud nuts holding the flywheel are revealed. Once the three lock-plate tabs are bent back, the nuts can be removed. Examine the flywheel starter teeth and the clutch friction face for wear; if the clutch plate mating face is worn, the flywheel will need machining.

A worn ring-gear can be split with a hammer and chisel. Make sure the flywheel is not damaged, and remove any burrs from its periphery—also from inside the new gear.

The latter is fitted by heating it evenly to about 350 deg. centigrade (which should give a light blue color to the steel), then slipping it over the flywheel and tapping lightly all around until it is firmly seated against its register. Make sure the teeth have their "lead" uppermost when placing ring on wheel.

Brake Adjustments

To adjust the brakes, jack up the car and place safety stands under the front suspension and rear axle, so all wheels can be rotated freely and their back-plates are accessible. The adjusting screws are turned clockwise to reduce clearance between shoe and drum.

There are two adjusters on each front wheel, but only one on each rear wheel. Starting at the front, turn one adjuster clockwise until the shoe binds on the drum, then slacken off until the shoe is just free of drum (two clicks of the adjuster should suffice). Repeat procedure with the other shoe.

The single square-headed adjuster on each rear wheel adjusts both shoes, as well as the handbrake mechanism, in one operation. Again, turn it clockwise until the drum is locked, then back off two clicks.

Should the handbrake cable slacken due to stretching, it can be shortened by turning an adjusting nut at the base of the handbrake lever.

Pull handbrake up three or four notches, hold the flats on the end of the cable assembly firmly (on no account must the cable be allowed to twist), then slacken lock-nut and turn adjuster until rear brakes are applied. Release handbrake, check that the wheels are then free to turn, and tighten lock-nut. . . .

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