

Imagine the days when the equivalent of 'Wheels' magazine included articles on the care and maintenance of popular cars. Imagine the days when the Traction Avant fell into the category of popular! Well, thank to

nor its Committee can accept any responsibility for any mechanical advice printed in, or adopted from this publication.

The Citroën Light 15 was introduced here in 1939 and has remained basically unchanged ever since. First noticeable modification came in

1953, when a luggage locker was added to the rear.

The Citroën incorporates some of the unorthodox ideas which have made the name famous ~ no chassis, front-wheel drive, wet-sleeve engine, and independent front suspension by torsion bars. The car gives about 25-27mpg [11l/100km] at normal driving speeds, and maximum gear speeds are quoted at: first, 26mph [42kph]; 2nd, 52mph [84kph]; top,

79mph [127kph]. Acceleration is stated as 0-30 [48kph] in 6sec.; 0-40 [64kph], 9.5sec.; 0-50 [80kph], 15sec.

The engine is a four-cylinder ohv unit with bore of 78mm, stroke 100mm, and capacity of 1,911cc. Rated horsepower is 15.08, and the car develops 56bhp at 4,250rpm on a compression of 6.2:1. The three-speed gearbox, controlled by a lever on the dash, is integral with the engine, and the differential is carried between gearbox and clutch.

The front-wheel drive is transmitted by shafts using sliding Cardan needle rollers in the universal joint bearings.

ENGINE, GEARBOX REMOVAL

The engine and gearbox must, of course, come out together, but this is a comparatively easy job. Drain the radiator and remove the bonnet, radiator shell, core, radiator cross-member. Remove the supporting brackets, then the battery, and disconnect all electrical wiring. Undo the gearshift linkage at the gearbox lower end only, then the clutch cable and speedo cables. Disconnect the flexible pipe at the fuel pump inlet take off the starter motor, ignition and carburettor controls.

Uncouple the vertical pipe from the exhaust manifold and remove the tie-rod between the vertical pipe and engine. Next take off the universal drive flanges at the gearbox end. The engine and gearbox unit can now be disengaged from the shell ~ a

sling placed round the water pump body will prove helpful at this stage.

The unit must be raised slightly to disengage the couplings from the gearbox one at a time. The assembly can then be lifted out.

When reassembling, there are a few points to watch. Place the unit in the body, engage the rear bearer in its housing, and fit the volute springs on their brackets, ensuring that the plain washers are in position. Then lower the unit, being careful to engage the drive-shaft couplings with the flange bolts. Mount the radiator cross-member and bolt the front suspension brackets to it. Fit the locking plates and nuts on the coupling bolts and tighten securely.

The engine suspension system must be properly adjusted. Remove the four bolts [inside the vehicle] which hold the suspension housing. At the front end, the unit is held in place with a twin-cone rubber bush on a pin. This allows the motor to move up and down slightly and permits correct setting of the rear rubber cushion in its mounting. To centre the rear rubber, loosen the locknuts of the volute spring adjusting screws, and turn them until a clearance of 5 to $\frac{7}{64}$ " above the horizontal centre-line along the opening is obtained. Endwise checking of the unit is by measuring the distance, using the existing hole in the housing. After fitting, measure the distance between

KNOW YOUR CAR

new member Tony Browne I am re-publishing the thirty-second article from a series on care and maintenance of popular cars. It was originally published in 'Modern Motor', in June 1957. As always with articles purporting to provide mechanical advice, neither CCOCA

Know
Your



CITROËN LIGHT 15

**Thirty-second article
of a series on
care and maintenance
of popular cars**

back of the housing and face of cushion ~ if this is not between $\frac{23}{64}$ " and $\frac{7}{16}$ ", the housing should be replaced.

Always use a new copper-asbestos gasket on the exhaust flange. To mount the clutch cable

A mandrel, centring tool or old mainshaft must be used to centralise the clutch plate with the mainshaft ball-race. While tightening, move the mandrel to make it slide freely and thus ensure true centralisation. Tighten the clutch-housing securing bolts to a tension of 14-15 ft/lb [19.7-21.1 Nm].

When fitting the gearbox, fit the dowel pins with circlips into the sockets in the cylinder block, and lightly grease the splines of the clutch centre-plate. Check that the gear, camshaft and relay shaft coupling dog is a sliding fit, with clearance not exceeding 0.006". If in excess of this, fit a new coupling dog.

If a new dog can't be fitted, it might be possible to close up the flanks of the coupling by slight pressure in a vice; but be sure not to crack the fitting. Fit the loose coupling to the gearbox relay shaft. Before pushing the box fully home, make sure the relay shaft coupling is in alignment with the camshaft end. The simplest way to do this is to position both the tongue and groove vertically. Position the flywheel closing plate between the flange of the bell-housing and cylinder blocks, then push the gearbox fully home. When tightening the securing bolts, give 14 ft/lb [19.7 Nm] tension.

The clutch withdrawal fork should have free play of 0.056-0.065" between the faces of the

thrust washers and toggles. A setscrew and locknut enable this setting to be obtained. Set the rear lock withdrawal fork on its guide bracket to give a clearance of between 0.040 and 0.078", then fit the dust cover to the bell-housing.

DISTRIBUTOR SETTING

To set the distributor, crank the engine slowly until No 1 cylinder is approaching the end of its compression stroke, then insert a pin 6mm [approximately $\frac{1}{8}$ "] in diameter into a special hole in the housing. This pin will fall into a recess in the flywheel, and at this point piston position will be 8° btdc. Take off the distributor cap and push the distributor shaft into the bush. Rotate the spindle slowly to engage the driving dogs. Fit a timing light in series with the distributor terminal and a lead from the coil, then turn the ignition on. If the points are closed, the light will come on. The rotor should be facing about No 1 segment. Now turn the distributor anti-clockwise until the points just separate [or the lights go out]. Turn the distributor a little further in the same direction until there is a gap between the points of 0.003-0.004". This should be about correct setting for ignition timing, but road-testing will be the only way to get the exact setting. Do not forget to withdraw the timing pin before starting the engine.

HEAD REMOVAL

The head can be removed

with the engine still in the vehicle. Drain the water and take off the bonnet, uncouple the hoses from the water pump and disconnect the battery positive lead. Take off the air cleaner, carburettor and fuel line. Disconnect the exhaust pipe and tie-rod from the manifold. Take off the fan-belt, remove the valve cover and uncouple the oil pipe from rocker-arm shaft. Take out the spark plugs, and the head nuts can then be loosened a little at a time, in reverse order to tightening sequence [see diagram].

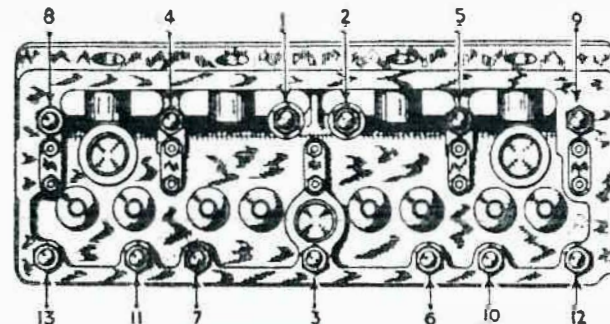
When refitting the head, clean the mating faces and give the gasket a light coating of chassis grease. Use a tension wrench and pull down first to 22 ft/lb [30.5 Nm], then go over again, in the correct sequence, and pull down to 36 ft/lb [49.3 Nm].

When adjusting the tappets to 0.006 inlet and 0.008 exhaust, the engine must not be running.

PISTONS, CONRODS

If you want to remove the pistons and conrods, the engine should be placed on a stand, preferably one which can be turned to different positions. After taking

Tighten the head nuts in this order.



off the manifold, turn the engine with the plug side down and remove the sump, timing cover and cylinder head: Remove the pushrods, tappets and oil pump. The conrods, main bearings and timing wheel nuts are locked by

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tab plates. Place a block of wood between the crankcase and the web of the crankshaft to stop the latter turning. The timing wheel nuts can be undone and both wheels and chain can be lifted off in one operation.

After marking each rod and cap with paint [to keep them

in correct order], remove the flywheel, conrod caps and main bearing caps, then lift the crankshaft out of the block. The piston and rod assemblies can then be withdrawn from the sleeves, which in turn can be removed by prising out with bar or screwdriver. The camshaft can be taken out

by removing the thrust plate.

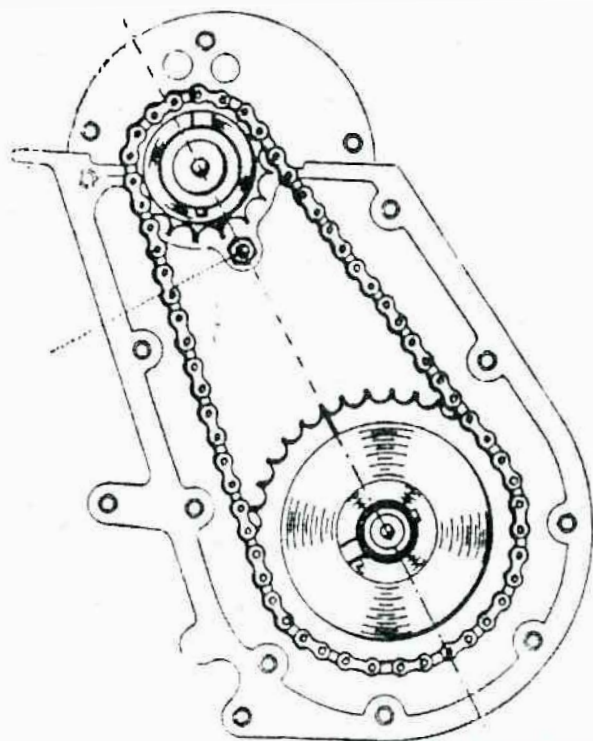
If the pistons are to be parted from the rods, the circlips should be removed and the piston heated in hot water to about 140°F before trying to extract the gudgeon pin.

WET SLEEVE TIPS

An important part of engine overhaul is the assembly of the cylinder barrels. Correct height and sealing must be obtained; if too high they will distort, if too low they will leak.

Always make sure that the leading faces of the sleeves and crankcase are perfectly clean, and fit the sleeves into position without any gasket or jointing. They should rest squarely on the crankcase and have slight movement in the bore of the crankcase at the lower end. The tops of the sleeves should be parallel with the block face to within 0.002". A good straight edge and a set of feeler gauges are needed for this

Left: Setting timing gears. If crankshaft gear is marked on tooth, set mark a half-tooth right of centre-line; if marks between teeth, set it dead on centre-line.



job. The tops of the sleeves should also be below the upper surface by 0.017 to 0.020".

To fit the sleeves, choose joints of a thickness which will make the barrel faces stand above the upper face by 0.002 to 0.004". Place the barrels together in pairs and give each joint a thin coating of linseed oil before placing it on the sleeve. The sleeve should drop into place without any hindrance from the packing joint. Pistons and barrels are supplied in mated pairs, so don't mix them up.

OIL AND WATER PUMPS

To dismantle the oil pump, remove the gauze strainer, followed by the base of the pump and the idler pinion. Drive out both pins which hold the driveshaft gear to the pump. The pump shaft with fixed oil pinion can then be drawn out, and the pinion moved along the shaft to remove the two halves of split collar and Woodruff key. If the oil-pump relief assembly has been disturbed, the factory method of setting should be followed, as the pump cannot be adjusted after installation.

To set the pump, heat up a tin of oil to 140°F, and drive the pump with an electric drill at 1,000rpm, using a bleed or pressure jet of 2.8mm. [about 0.09"]. The adjusting screw or plug should be turned to give a pressure of 35-35½psi [2.4bar].

Dismantling the water pump is a simple operation. Start with the fan and pulley, which should come off easily by tapping the end

of the shaft. Don't overlook the locking key. Remove the slotted ring nut which retains the ball-race, push the shaft out half-way [using a press or mallet] and remove the two half lock rings of the ball-race. Then remove the shaft. Take off the gland nut, gland and packing. A stepped drift can be used for removing the bush. A cross-pin is used to hold the impeller on the shaft on early models, but on later ones the impeller is shrunk on and is serviced as an assembly.

SHRUNK FITTINGS

Usually it is necessary to replace valve seats only if they are burnt or cracked. Many engine reconditioners have their own way of going about this, but the factory method is to heat the insert in one spot with a pinhole jet until the metal just starts to melt. Allow it to cool for about three minutes, and it can then be removed easily with a screwdriver. Liquid air is best for shrinking the new insert before fitting.

If the starter ring gear needs renewing, you can either knock it off the flywheel or drill a couple of holes at the root of one of the teeth and split the ring with a chisel.

There are two types of new ring gear. One is the cyanide-hardened type, which can be fitted in any position as long as the chamfered edge of the teeth is towards the engine. The other is the 'double duro' type, identified by a punch spot. With this type

the punch mark must be in alignment with the offset fly wheel bolt-hole. To fit the new ring gear, heat the inner circumference to 200-250°C, which will produce a straw-yellow colour.

Then, using a pair of hooked

together but do not use any gasket cement flex the diaphragm before nipping up the holding screws. Do not forget to fit a fibre washer under the head of the dome cover screw.

Before fitting the assembled pump test it as follows: close the outlet orifice by screwing in

a 12mm diameter plug of 100 pitch, and on the inlet side fit a suitable union nut and fuel pipe. Submerge the pump in a can of petrol with the inlet pipe exposed. Force air into the pipe at low pressure [about 1 to 4lb will do] and watch for air bubbles. If any bubbles come from near the control lever, the diaphragm is leaking. Any air bubbles at the joining faces show that they are defective or are not properly tightened. A few bubbles may appear when the pressure is first applied and the diaphragm flexes, but these can be disregarded if they do not continue to show.

CLUTCH OVERHAUL

If you are removing the clutch, the makers recommend that you take out the engine. It's certainly possible to remove the assembly by uncoupling the engine from the hull and raising it with a garage jack to enable the gearbox and clutch housing to be taken off. However, this procedure is lengthy and difficult owing to poor accessibility.

If the clutch is the six-spring type, the pressure plate surface

should be concave. If it is the nine-spring type, the pressure plate face is very slightly concave or flat. Any metal removed from the clutch by machining should be compensated by fitting steel washers under the valve springs.

On the light type of flywheel, the makers recommend a washer of 0.040" thickness under each spring to avoid clutch slip; this is additional to the washer used as compensation for machining. Make sure that any metal cut from the flywheel face is also allowed for near the stepped centre portion, otherwise the clutch, plate centre torsional springs may foul against the flywheel nuts.

For efficient clutch operation,

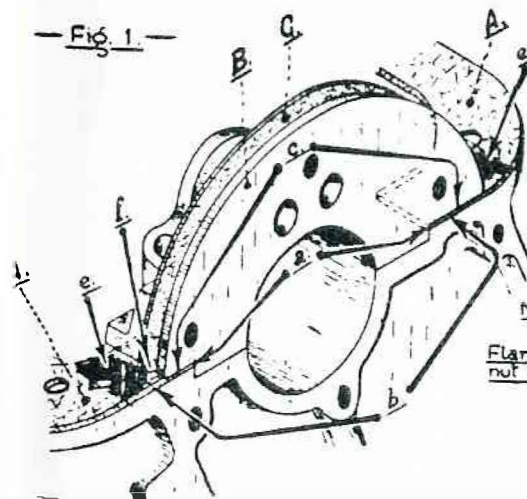
the pressure springs must be matched. On the six-spring type, the springs should be of the same colour throughout ~ green, yellow or orange. On the nine spring type blue, white or red springs are used. These can be of the same colour except all-red, which would be too harsh. The colours can be mixed on the nine-spring type, provided the same colour spring is used each side of the three clutch toggles.

FRONT END WORK

Removing and dismantling front end components is extremely difficult, in some cases impossible, without the use of special tools and fixtures designed by the factory. For this reason, we

FITTING OF PUMP GASKETS.

— Fig. 1 —

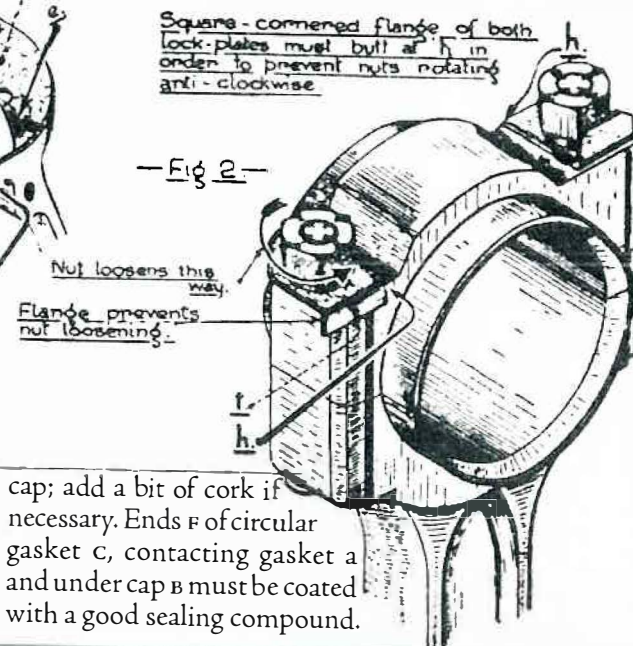


Precautions when assembling. Gasket A must butt against bearing cap B and be flush against face to which timing-case is fitted. It must be pinched under

POSITION OF LOCK-PLATES FOR BIG END NUT FITTING

Square-cornered flange of both lock-plates must butt at 'h' in order to prevent nuts rotating anti-clockwise

— Fig. 2 —



cap; add a bit of cork if necessary. Ends F of circular gasket C, contacting gasket A and under cap B must be coated with a good sealing compound.

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wires, place the gear squarely on the flywheel, where it will shrink and grip tightly as it cools.

FUEL PUMP CHECK

The inlet and outlet valves are set in the pump body, and in the event of the valves being faulty, the pump body must be replaced. To reassemble, fit all four diaphragm discs to the operating rod, without tightening the nut, and place the diaphragm control spring in the pump body. Mount the diaphragm assembly and connect the square piece with the operating lever with diaphragm rod. Place a fibre washer each side of the lever, then fit the pin and rivet over at each end.

Make sure the priming lever properly engaged with the diaphragm operating rod, then fit the operating lever return spring. Line up the hole in the diaphragm with those in the casting, and tighten the nut at end of the diaphragm operating rod (?) to clamp the discs together. To prevent petrol from seeping down the threads, flow solder in the nut thread.

Join the pump castings to-

are obliged to quote the tool identification number where a special tool [outside the universal types] is necessary

To take off the front axle, drain the radiator, jack the car up and place the stand under body,

studs, using a lever to part them if necessary. Should the torsion bars come out together with the front axle, disconnect them, using split block No MRI578. One paintmark is placed on the right-hand bar, two on the left. When

refitting the bars make sure the ball-head screws of the adjusting

levers are completely unscrewed, then bring each bar into relation to the silent bloc on the cradle. With the adjusting lever resting on the ball-head, lower the bottom link arm of the front axle by about two serrations. Now fit the torsion bars. Complete the fitting of the bars in the silent bloc by using tool No MR3349. Don't forget to place a spring washer under the fixing bolt. Connect the drive shafts and make sure that the shaft and yokes are at 90° to each other. After coupling up the parts, the brakes must be bled and the steering angle adjusted.

To adjust steering and suspension angles, the car height must be checked first, and if necessary the torsion bars trimmed to give correct measurements. These are made with the car at kerb weight, but without passengers, from the torsion bar centre to ground at front, and from under side of hull rear floor to ground at rear. Front measurement should be 10⁵/₈", rear 10⁷/₈".

To adjust caster, check hull height and [if caster is not correct] slacken the clamp bolt of the

upper link spindle and screw the nut and lock-nut on the threaded portion, or use a flat spanner to turn the spindle.

Camber is not adjustable. The front wheels have toe-out, not toe-in. To adjust, turn the track rods an equal amount, making sure the difference in their lengths does not exceed 1/32".

TUNING DATA

Firing order: 1, 3, 4, 2
Comp. pressure: 108lb. [approx.]
Oil pressure: 28-35lb
Bore: 78mm
Stroke: 100mm
Plug gap: 0.025"
Points gap: 0.014-0.018

VALVES

Tappets [hot]: inlet, 0.066; exhaust, 0.008"
Inlet opens 3° btdc
Exh closes 11° otdc
Face angle [all]: 30°
Seat widths: inlet, 1/32", exhaust, 1/16"
Spring test: Inner, 1¹⁹/₆₄", at 2³/₈lb, outer, 1²⁹/₆₄", at 32lb

CARBURETTOR

Solex 35FA TIP
Choke: 26
Main jet: 135
Air correction: 210
Pilot jet: 45
Pilot air bleed: 180
Starter air jet: 4
Starter fuel jet: 115-125

CLUTCH

Spring test: 6-spring type, free: 1¹¹/₆₄-1⁴⁷/₆₄"
Compressed to 1³/₈": 103-110lb
9-spring type, free: 1⁴⁹/₆₄-1⁷/₈"

Compressed to 1¹¹/₃₂": 77¹/₂-78⁵/₈"
Finger height with three 1.24" gauges under pressure plate and cover raised ²⁵/₃₂" above surface: 2²³/₆₄"

FRONT END

Caster: 7¹/₂ plus or minus 1/4deg
Camber [fixed]: 1 plus or minus 1/2°
Toe-out: 5/64"

TENSIONS

Head: initial: 21¹/₂ft/lb, final: 36ft/lb
Big ends: 22-29ft/lb
Mains: 50ft/lb

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behind steering. Remove bonnet and battery positive terminal. Disconnect wiring to head, side-lights junction box and horns. Remove front wheels and bumper. Take off the mudguard and radiator shell assembly [without disconnecting the shell from the guards]. Start by removing bolts fixing guards to guard stays.

This will hold the guards in place until removed. Raise the engine and gearbox and place a block under the clutch housing. Remove the radiator and cross-member. Undo the hydraulic hoses at the brackets and disconnect the track rods from each steering arm. [A ball-pin extractor may be needed for this operation.] Uncouple the drive shafts from the gearbox flanges and slide the couplings on the splines away from the gearbox. Remove the screws which hold the torsion bars. These are inside the recess of the front 'silent bloc' fittings. Undo the four nuts which hold the front axle assembly to the hull, and take off both mudguards and bumper brackets. Disengage the front axle from the four hull

- ⌘ 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

FAULT-FINDING CHART

- [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, check 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

- ⌘ 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 sapped 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

- ⌘ 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

This Fault-Finding Chart and the preceding article were originally published in 'Modern Motor', in June 1957 and was kindly provided by new member Tony Browne. ⌘

Membership Renewal Forms

Your membership renewal for the club year, which runs from 3rd March 2013 to 2nd March 2014 is included with this edition of Front Drive This year in a bid to reduce both paper usage and secretarial stress, we will only be sending you one form, so you need to complete this one and send it to us at
PO Box 52, Balwyn Vic 3103.

If you misplace your form a blank form is available at www.citroenclassic.org.au.

Before you ask, yes we need a paper copy and yes we need it signed, even if you are a life member or have only recently joined the club.

Thanks, Sue.