

2CV ENGINE PROBLEMS

By Graeme Dennes

Revision 6

This article presents a list of typical engine problems that can beset the starting and running of a 2CV. The most likely solutions are suggested. Our 2CVs are getting older, and the chances of something failing increases with time because our older cars are made up of a large number of older parts getting closer to failure! The key to minimising problems is *periodic inspections* and *periodic preventative maintenance*. Be vigilant about it. For example, do you know the age of the diaphragm in your fuel pump? When did you last closely inspect the drive shaft boots? Although we can never guarantee to prevent every failure in our ageing cars, it's much more convenient to deal with issues at home rather than suffering the potentially huge inconvenience of dealing with issues out on the road.

Use this information as a guide only. It is not, and cannot be, a substitute for a formal diagnosis of a problem. Although the entries are in groups, they are not in any specific order and some entries appear in more than one group.

Unless stated otherwise, this article presumes the 2CV is fitted with Citroen-specified parts which have been installed and adjusted in accordance with Citroen's specifications. Otherwise, the information provided here may not apply.

Critical Settings:

Where possible, before commencing fault diagnosis, ensure the following three critical engine settings are correct to prevent masking of problems:

1. Carburettor float heights.
2. Valve clearances.
3. Ignition timing.

The Quick Answers?

1. If the engine is cantankerous to start when cold, the most likely cause is faulty spark plug leads. More follows.
2. If the engine is cantankerous to start when hot, the most likely cause is either valve clearances closing up or faulty ignition coil. More follows.
3. If the engine totally refuses to start, without even a hint of life, the most likely cause is a lack of spark. More follows.

Cantankerous to Start When Cold?

1. Most likely cause? High resistance plug leads, *caused by a lack of maintenance!* Replace with genuine Bougicord 3166 leads. These are resistive leads with a resistance of 3000 ohms each as specified by Citroen. Don't use standard plug leads which can be 8000 to 15000 ohms each, making starting much harder for the 2CV and possibly causing failure of the ignition coil by high-voltage flash-over. How old are your plug leads? Refer to the writer's article, *2CV Ignition Coil*.
2. Cracked fibre spacer at base of carburettor. This can also cause backfiring on start-up and difficult cold running. Replace spacer, fitting a paper gasket on each side.

Cantankerous to Start When Hot?

1. Most likely cause? Valve clearances closing up, *caused by a lack of maintenance!* This causes the valves to be opened longer, resulting in reduced compression pressure, making the engine much harder to start. It also changes the valve timing. Check the valve clearances are set to 0.2mm when the engine is cold, *using the specified Citroen procedure*. Attend to this quickly to minimise overheating of the exhaust valves. How long has it been since you checked the valve clearances? Check the valve clearances every year as part of the annual maintenance steps.
2. Incorrect dwell angle setting of the points. Ensure the dwell setting is correct. If the dwell angle is higher than specified, the average current in the coil is increased, which may overheat the coil and potentially damage it. Whenever the dwell angle is adjusted, check/set the ignition timing.
3. Faulty ignition coil. Internal damage to the windings or to the insulation layer between the windings reduces the spark voltage, potentially preventing the plugs from firing. The coil may still be faulty even though the winding resistances measure correctly. The easiest and fastest test? *Try another known-good coil!* Refer to the writer's article, *2CV Ignition Coil*.
4. Coil is running hot, usually caused by shorted turns in primary winding. (This presumes the points dwell angle has been set correctly.) The induced high current circulating in the shorted turns raises the temperature of the wire in the shorted turns and thus the coil temperature.
The shorted turns also result in an increase in the average primary current which further raises the temperature of the coil. Neither of these conditions is part of the coil's normal operation, and so an increase in coil temperature flags an abnormal condition. The shorted turns also result in a reduction in the spark *energy* available at the spark plugs because of self-damping of the primary winding by the shorted turns, making starting difficult. In the worst case, the spark plugs may not fire at all because of insufficient spark voltage, preventing the engine from starting.
In summary, a *serviceable* ignition coil does *not* run hot! It was not designed that way! If you have checked all the applicable items above and the coil still runs hot, *it's faulty*. Straight to the bin! However, the coil *may* run warm in operation.
5. Rich mixture. Check float height and idle mixture settings.
6. Ensure choke butterfly is fully open when choke is off.

General Starting Issues:

1. When a 2CV engine totally refuses to start, no matter what you do or how nicely you choose to speak to it, the most likely cause is electrical, *so check for the presence of spark as the first step*. If using an electronic ignition system, ensure there is a good electrical connection between the 12V wire from the ignition switch and the 12V wire leading to the electronic ignition unit. This wiring connection will be in the wiring bundle near the ignition coil.
2. If spark is present, *the fuel pump is the next most likely cause*. Disconnect the fuel hose from the carburettor spigot, then crank the engine for a few seconds. Fuel should be ejected in spurts from the open end of the fuel hose. If fuel dribbles out from the hose or no fuel appears, the fuel pump diaphragm will need to be replaced.
3. Follow the engine starting procedure stated in the 2CV Owner's Manual:
On first start of the day: full choke and don't touch the accelerator until it starts, then ease the choke in.
At other times, no choke and press and hold the accelerator full on until it starts.
4. Spark plugs. Replace. Set the gap to 0.7mm. *Remove and replace only when cold.*

5. Ensure the dwell angle of the points is set per the vehicle specifications. For information, dwell angles are typically set to around 240 degrees divided by the number of cylinders, so for a 2-cylinder engine, the dwell angle will be set to around $240 / 2 = 120$ degrees. Whenever the points are adjusted or replaced, the ignition timing must be checked/set.
6. Points and capacitor (if fitted). Replace. A faulty points capacitor can cause the points to burn, migrate metal and bond together. Points capacitors are heavily stressed in points ignition systems. Easiest of all? Install electronic ignition, set the timing once, then promptly forget all about it!



7. Coil has suffered a high-voltage flash-over between its windings. This is usually caused by plug leads having excessive resistance or plug gaps too wide. The spark voltage may be reduced as a result, causing hesitation at load, or may result in starting or running problems. Check using a known good coil. Refer to the writer's article, *2CV Ignition Coil*.

8. Bad plug leads. Replace the pair if either one is over 5000 ohms resistance. More follows.

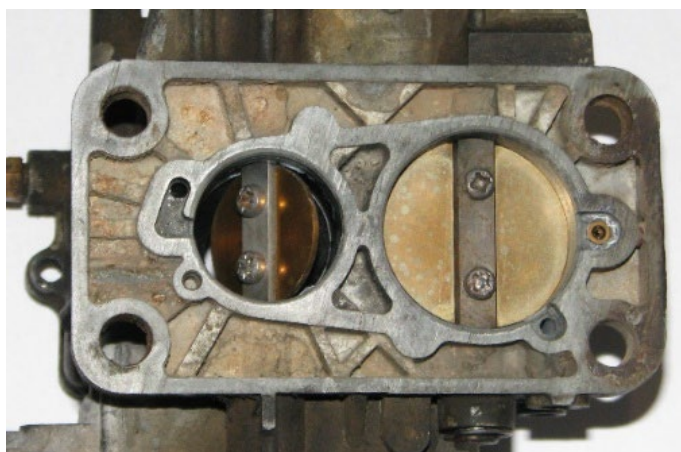
9. Ignition timing. Check with timing light and tachometer at 800–850 RPM.

10. Weak ignition coil (weak spark). Check using a known good coil.
11. Backfiring? Can be caused by a weak coil. Check using a known good coil.

General Running Issues:

1. Ensure the engine static timing marks are clearly visible and correctly positioned. Check with a 6mm pin or drill inserted through the engine housing into the flywheel. If the marks are not present, apply the appropriate reference marks.
2. Ensure ignition timing is correct at 800–850 RPM using a strobe timing light and tachometer. An *inductive pickup* timing light and *inductive pickup* tachometer make the operation so much easier and quicker.
3. When the engine has warmed up, check/adjust idle speed and idle mixture for a smooth idle at 800–850 RPM.
4. If the idle mixture screw needs to be turned out more than say four or five turns to achieve a smooth idle, remove the idle mixture screw and check the needle point to ensure it's not bent, worn, damaged or broken off and lodged in the seat from over-tightening. If it is, replace it. Refer to the writer's article, *2CV Maintenance* for more details.
5. Engine idle speed too high and can't be set to 800–850 RPM? Refer to the writer's article, *2CV Secondary Choke Butterfly Adjustment*.
6. Engine has a rough idle that can't be smoothed out with the idle mixture screw? Refer to the writer's article, *2CV Secondary Choke Butterfly Adjustment*. Could also be caused by valve timing, so check valve clearances.
7. *Instant* hesitation on throttle operation? Ignition coil high-voltage breakdown. Check using a known good coil.
8. Hesitation at speed? Fuel starvation. Ensure small mesh fuel filter under brass cap on forward face of carburettor is clean.
9. Hesitation at speed? Fuel starvation. Replace fuel filter.

10. Hesitation at speed? Fuel starvation. Check fuel pump delivery. If insufficient, replace fuel pump diaphragm. (Refit fuel pump *only* when the fuel pump pushrod is at the *lowest* point of its travel to prevent damaging the pushrod when the fuel pump bolts are tightened. You won't want this to happen as you may not be able to remove the damaged pushrod without splitting the engine cases!!! Darn!).
11. Ensure carburettor floats are not binding on the sides of the float chambers.
12. Ensure carburettor float hinge does not have excessive play which allows floats to bind or twist. If too much play, tighten the hinge tangs a little to prevent looseness of the float.
13. Ensure *both* carburettor butterflies reach the *fully* open position at the *full* throttle position (to feel the dizzying power surge of the 2CV!).
14. Ensure carburettor butterflies do not go over centre at full throttle.
15. When engine is idling, if it eventually slows down and stops, the float valve may not be completely shutting off the fuel, allowing the fuel height in the carburettor to slowly rise to the point where the engine is forced to stop. Replace the float valve.
16. Fuel mixture problem? Ensure the carburettor float heights are correct.
17. Engine backfiring into the inlet manifold and carburettor? Most likely the fuel mixture is too lean so check carburettor float settings but could also be caused by insufficient inlet valve clearances or incorrect ignition timing. Can also be caused by a faulty coil.
18. Engine backfiring into the exhaust system? Most likely the fuel mixture is too rich so check carburettor float settings but could also be caused by insufficient exhaust valve clearances or incorrect ignition timing. Can also be caused by a faulty coil.
19. Engine stops on throttle operation? Ensure the carb's (larger) secondary choke butterfly does not start to open until the (smaller) primary choke butterfly is about half open as in the photo on the left. If the secondary butterfly is opening too early, there's a problem with the linkages connecting the two butterflies.



20. Fuel leaking from carb? Float heights incorrect or floats binding. Adjust floats.

21. Fuel leaking from carb? Float valve not shutting off. Replace float valve.

22. Slight (or worse!) oil leaks from your 2CV engine that won't go away? The 2CV engine relies on the presence of a (small) crankcase vacuum to ensure the engine oil is retained inside the engine crankcase. There's three points of failure where air can enter the crankcase and "kill" the vacuum, allowing the engine oil to escape, so these three items need to be checked in the first instance:

- (1) ensure the rubber sealing ring under the cap of the oil breather is in a sound condition and is properly sealing off the oil breather when the cap is latched closed;
- (2) ensure the short rubber hose connecting the small drain tube at the base of the oil breather to the small tube on the side of the dipstick tube is in sound condition and is properly sealing against the two metal tubes, and
- (3) ensure the small plastic "plug" at the top of the oil dipstick is properly sealing off the dipstick tube when the dipstick is in place.

The proper sealing of these three items is vital to preventing air entry into the crankcase and the oil leaks which can follow. Don't do any further diagnostics until you've confirmed these three items are doing their jobs correctly. Then, if the oil leaks are still occurring, it could indicate a failure of the oil breather. Refer to the writer's article *2CV Oil Breather* which provides a simple procedure for checking the correct functioning of the oil breather using a manometer.

My grateful appreciation and acknowledgement is given to the web site from which the photo of the ignition coil has been drawn.

Before using the information in this document, ensure the most recent revision is being used.

This document may be updated in the future and assigned a new revision number.

Should you have any questions about the document or if you find errors or have suggestions for improvement, please contact the writer at: gdennes@gmail.com

Copyright © Graeme Dennes 2020, 2022