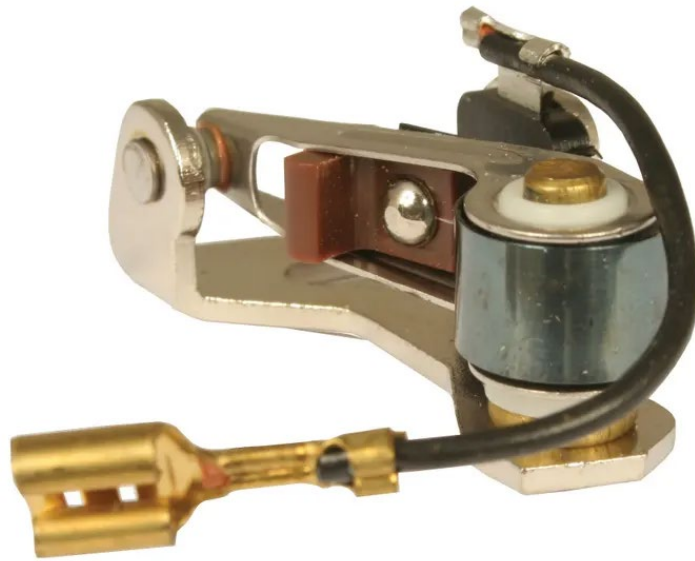


2CV POINTS IGNITION REINSTALLATION

Revision 3



Um, what is zis?

Graeme Dennes

2CV POINTS IGNITION REINSTALLATION

Revision 3

By Graeme Dennes

Prelude:

This article is written in consideration of the many 2CV owners whose vehicle is fitted with electronic ignition.

In the unlikely event that the electronic ignition unit should fail, this article discusses the parts required and the procedure to follow to remove the failed electronic unit and replace it with the original points ignition components as fitted to the 2CV at manufacture.

This will be of particular assistance in a roadside situation when away from home. The jackpot prize is that the pleasure drive currently being undertaken in your 2CV doesn't have to be abruptly terminated.

Although the modern electronic ignition systems made for the 2CV are highly reliable devices, should your unit fail when you are out on the road, refitting the points ignition to the 2CV may very likely prove to be a much quicker route than phoning for a tow truck (even presuming that a mobile signal from your service provider is available), waiting for the tow truck to arrive, loading the vehicle and securing it for transportation, and then the slow trip to home.

Fitting points ignition has no downside - we are fitting the original ignition system specified for the vehicle. We take the parts from the spares box, fit them to the vehicle and continue on our journey.

The only responsibilities ahead of time is to ensure the requisite set of parts and some basic tools are carried to enable the roadside ignition system changeover to be done. This article describes the procedure.

Purpose of Article:

This article describes the procedure to reinstall the points ignition in the 2CV should the installed electronic ignition unit fail.

Background:

The points ignition system (a.k.a. the Kettering ignition system or inductive discharge ignition system) was used by spark-ignition engines for about seventy years. In the 1970s, vehicles started being rolled out with electronic ignition. (The star of the show, the 2CV, continued to have points ignition fitted right up to the very last vehicle manufactured on 27 July 1990).

Points ignition systems require ongoing maintenance over the life of the vehicle, from cleaning, facing and aligning the points, setting the gap or dwell angle, setting the ignition timing, and replacing the points and capacitor at service intervals. Performing these tasks requires access to the points box, which is rather well hidden behind the mesh grille, the fan and the protective rubber shield. From an operational perspective, points ignition (in any vehicle) can be impaired by the presence of moisture, oil or dirt on the points faces, all of which are present under the bonnet, and which can cause starting, idling and running issues. A faulty points capacitor can cause burning or erosion of the points, and in the worst case, can prevent the engine from starting or running.

Now to Today:

Many 2CVs have been fitted with electronic ignition, designed to replace the factory-fitted points box and components, the points cam, centrifugal weights and springs. The easiest type of electronic ignition unit to install is the type which fits in place of the points box and uses the same mounting arrangement. One replaces the other.

There are a number of benefits resulting from making the changeover to electronic ignition. It increases the efficiency of spark production, maintains a strong spark during lowered battery voltage, improves the consistency and accuracy of ignition timing at each cylinder across the engine RPM range, *accurately* applies the “mechanical” timing advance characteristics required by the engine, and improves engine starting, idling and running performance, while totally removing the need for ongoing maintenance. Also, when points ignition is used, the ignition coil can be destroyed from overheating from leaving the ignition key turned on when the engine is not running. The electronic ignition counterpart prevents this. A remarkable set of capabilities. Electronic ignition is an install-set-and-forget alternative to points ignition and is a high-benefit, non-permanent modification to your 2CV. That’s the good part.

Although your 2CV may have electronic ignition fitted, even the best of them have a mathematical probability of failure, albeit very small. If the electronic ignition fitted to *your* 2CV fails when you are away from home, there are two basic options available:

1. Hitch a lift home with your roadside assistance service, which also brings your road trip to an end.
2. Remove the electronic ignition unit and reinstall the points ignition components held in your spares box. This article discusses this option.

Parts Required:

The parts required (in four groups) are as follows:

A. The eleven items fitted to the points box per Fig. 1:

1. Points box (housing) (Photo 13)
2. Capacitor fixing screw and washer (Photo 15)
3. Points pivot (part of points box)
4. Fixed arm of points (Photo 15)
5. Points locking screw and washer (Photo 15)
6. Moving arm of points with spring (Photo 15)
7. Insulator block (Photo 7)
8. Capacitor holder (Photo 10)
9. Points electrical (spade) connector (Photo 9)
10. Screw and washer to secure items 6 – 9 and the connecting wire from 11 (Photo 15)
11. Capacitor (condenser) with mounting bracket and connecting wire (Photo 8)

B. The four items fitted behind the points box per Fig. 2:

1. Spring circlip (Photo 6)
2. Thrust washer (Photo 6)
3. Points cam with centrifugal weight pivots (Photo 1)
4. 2 x Springs and centrifugal weights (Photo 2)

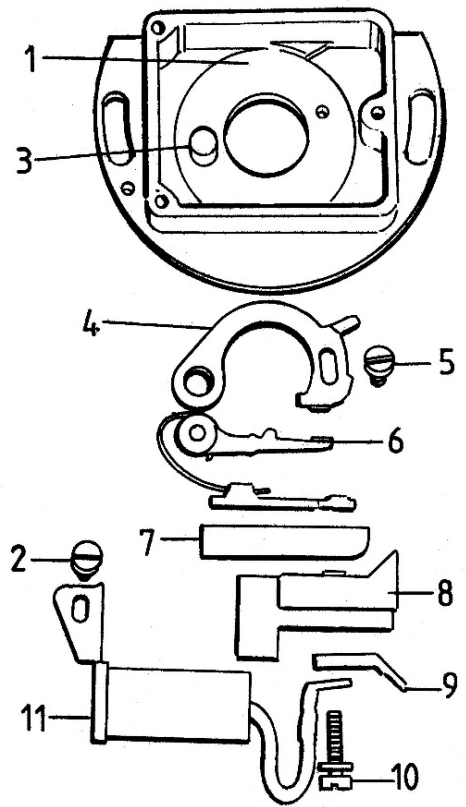


Fig. 1 Items fitted to points box (Courtesy of Haynes Publishing)



Photo 1. Points cam with centrifugal weight pivots

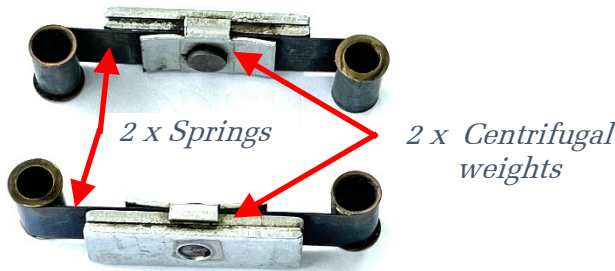


Photo 2 Springs and the attached centrifugal weights

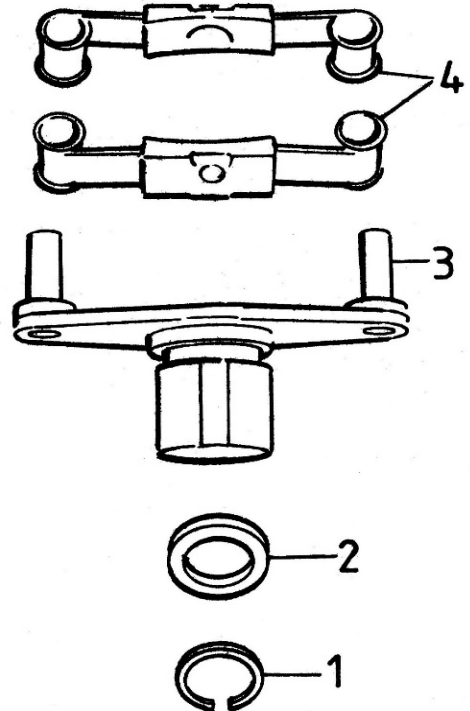


Fig. 2 Items fitted behind points box (Courtesy of Haynes Publishing)

- C. The four items per Photo 3:
1. Protector plate (fits behind the points box)
 2. Points box cover rubber gasket
 3. Points box cover
 4. 3 x cover screws and washers

D. Four further items needed: multimeter, 0.4 mm feeler gauge, 6 mm pin or drill and a smallest tube of points cam grease.

Total items required from the spares box:
 = A (11 items) + B (4 items) + C (4 items)
 + D (4 items)
 = 23 items

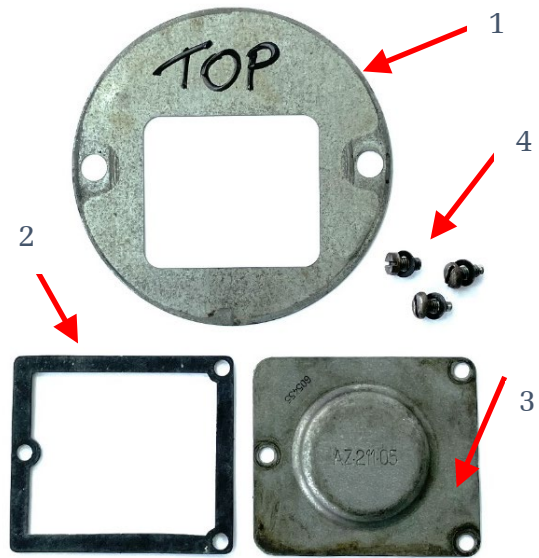


Photo 3 Further items needed



Photo 4 Points cam, springs and centrifugal weights looking from the front, ready for fitting onto camshaft. Note how the springs are fitted.

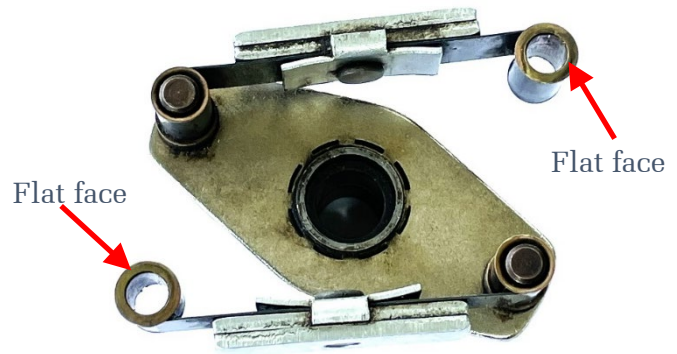


Photo 5 Springs and centrifugal weights looking from the rear. Note how the springs are fitted.



Photo 6 Spring circlip and thrust washer



Photo 7 Insulator block



Photo 8 Capacitor (condenser)



Photo 9 Electrical (spade) connector



Photo 10 Capacitor holder

Extension End of Camshaft Assembly:

Photo 11 shows the extension end of the camshaft with all removable parts removed.

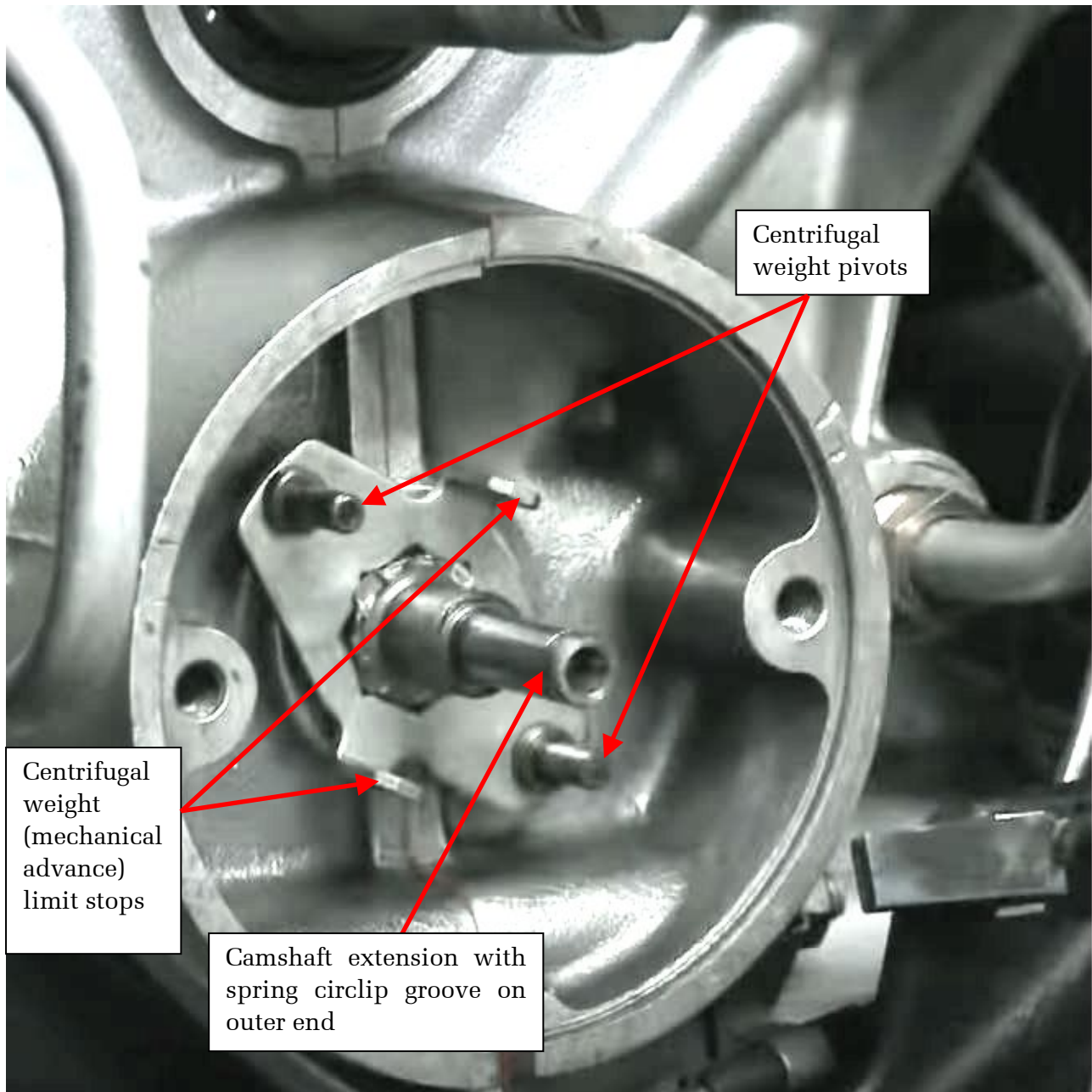


Photo 11

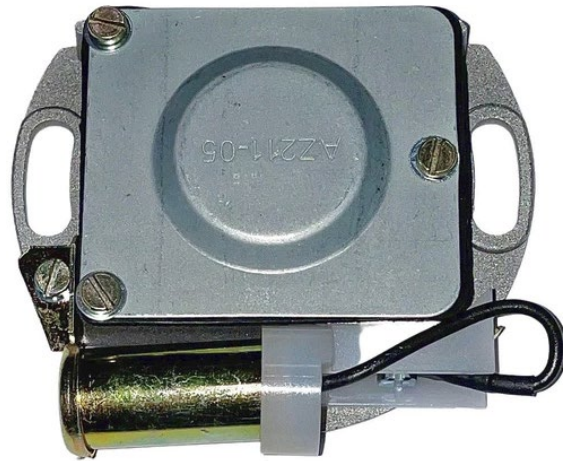
Fitting the Springs and Centrifugal Weights:

Fit the springs and weights as shown in photos 4, 5 and 19 to ensure the ignition timing is *advanced* as engine RPM increases.

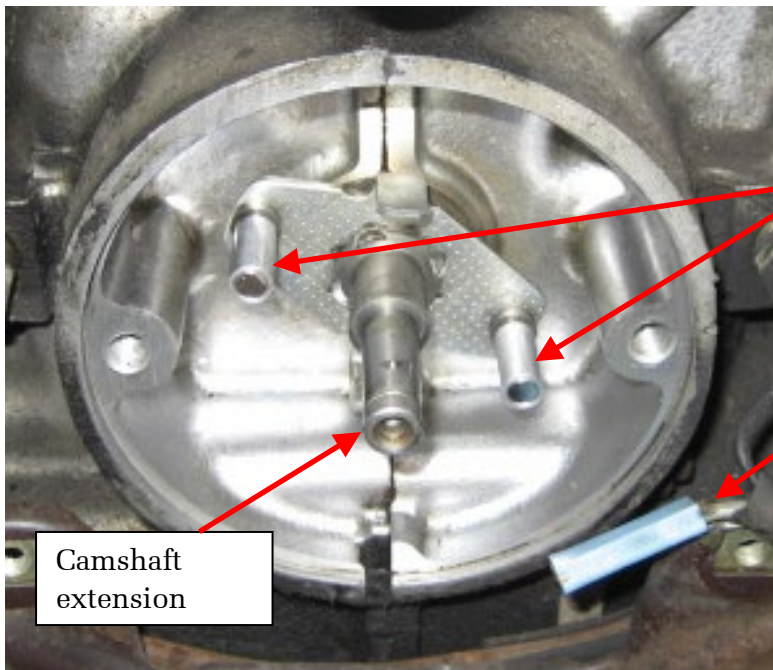
If the springs are fitted in the opposite manner (i.e., to the opposite pivot pins), the ignition timing will be *retarded* as the RPM increases! You don't want this option!



Photo 12 Bare points box



*Photo 13
Assembled with gasket, cover, screws
and washers*



Camshaft
extension

*Cylindrical magnets fitted to
the pivots*

*The connector and wire
connect to the points spade
connector when points
ignition is fitted. Unused with
electronic ignition, but
usually left in place for
another day.
Well, today we need it!*

*Photo 14
Shows the cylindrical magnets fitted
to the centrifugal weight pivots with
electronic ignition installed.*

An example of a 2CV Electronic Ignition:

One popular electronic ignition developed specifically for the 2CV is commonly known as the “Black” 123 ignition from *123ignition* in The Netherlands. Shown below. Various other models are also produced for the 2CV, with some being programmable. Models are also available for many other vehicles.

The instructions following presume the “Black” 123 ignition is fitted to the vehicle. If your 2CV has a different electronic ignition fitted, you may need to vary the procedure accordingly.

Three coloured wires exit the unit. The red wire connects to the +12V line from the ignition switch, the yellow wire connects to the “+” terminal of the ignition coil primary winding, and the black wire connects to the “-“ terminal of the coil primary winding.

For information: The manufacturer, *123ignition*, states the “black” 123 ignition (below) should be used only with the standard 2CV “black” coil. “Exotic” coils will generally have a lower resistance primary winding, which can cause the “black” ignition unit to be damaged.



Photo 15 Electronic Ignition cylindrical magnets

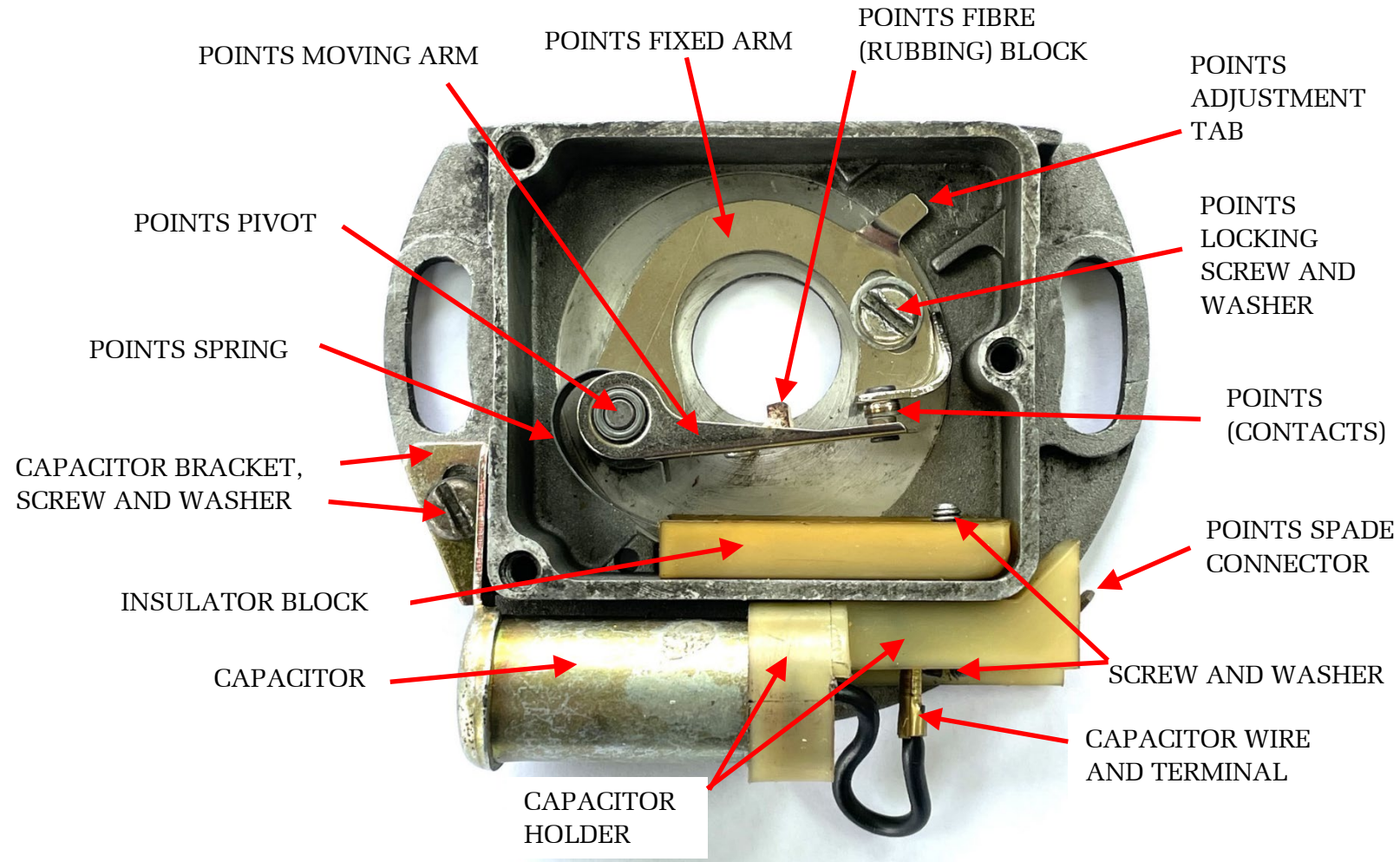


Photo 16
The “Black” 123 ignition unit.
(The label background is black!)



Photo 17 Rear view

POINTS BOX COMPONENTS



*Photo 18 Inside the points box with cover and gasket removed.
Ready for fitting to vehicle.*

OUT WITH THE NEW AND IN WITH THE OLD!

Step 1: Remove the Faulty Electronic Ignition:

1. Remove the front grille and put the four bolts and washers aside.
2. Remove the fan and put the centre bolt and washer aside.
3. Remove the rubber shield, both metal brackets and the seven bolts and washers and put them aside. The electronic ignition unit will be visible, just below the crankshaft.
4. Clean the electronic ignition unit and the adjacent areas.
5. Identify the three coloured wires coming from the electronic ignition unit. The three wires will exit the front of the fan cowling on the left hand side, usually sheathed in some form of plastic tubing for protection. The yellow and black wires will run to the ignition coil primary winding connectors while the red wire will run to the +12V supply from the ignition switch.
6. A fourth wire in the cable sheath is the wire running from the engine oil pressure switch to the oil pressure warning light on the instrument panel.
7. A fifth wire in the cable sheath – assuming the wire is present, is the unused points wire, left over after the electronic ignition was installed. The points wire plastic connector will be positioned closely to the electronic ignition unit. (When points ignition is fitted, this wire and plastic connector connects to the points box spade connector, and the other end connects to the “-“ terminal of the ignition coil primary winding.) *If this wire is not present, it will need to be replaced before the vehicle can become operative with points ignition.* Fit it with an insulated spade socket at the points box end and a bullet socket on the other end for connecting to the coil primary “-“ terminal.
8. Snip off the crimped terminals on the ends of the electronic ignition unit’s red, yellow and black connecting wires to enable the faulty ignition unit to be removed, drawing the three coloured wires back down the cable sheath to the inside of the fan cowling before the electronic ignition unit can be removed from the vehicle. A small metal cable clamp may need to be opened up near the electronic ignition unit to allow the three wires to become free of the vehicle.
9. Once the electronic ignition unit wiring is free from the plastic sheath, loosen and remove the two bolts and square washers holding the electronic ignition unit to the engine. Put the bolts and washers aside for now.
10. Remove the electronic ignition unit and its wiring from the vehicle.
11. Once the ignition unit is removed, photo 14 shows what should be seen. The two small cylindrical magnets are shown fitted to the weight pivots and held in place by the magnetic attraction between the magnets and the pivots. Photo 15 shows the magnets themselves. Carefully remove the magnets from the pivots and store them in a safe place.
12. With the electronic ignition unit removed from the vehicle, clean the exposed area behind it and around it.
13. The vehicle is now ready for the installation of the points ignition.

Step 2: Install the Points Ignition:

1. Take your points ignition spare parts from the spares box. Ensure you have all the parts shown in Figs. 1 and 2 and photo 3. Keep an eye on the spring circlip as it is small, springy(!) and very easily lost!
2. Using the previous figures and photos as a guide, start by assembling the points cam and springs and weights per photos 4 and 5, with the springs and weights fitted on the pivot pins as indicated. One end of the springs fits over the pivots shown in photo 1. The other end of the springs fits over the pivots shown in photo 11.

3. Push the points cam, springs and weights onto the end of the camshaft to fully seat the assembly. Ensure the springs are correctly fitted as previously discussed and as shown in photo 19 below.
4. Fit the thrust washer, followed by the spring circlip. *Ensure the spring circlip is correctly and fully seated in its groove on the end of the camshaft extension.*

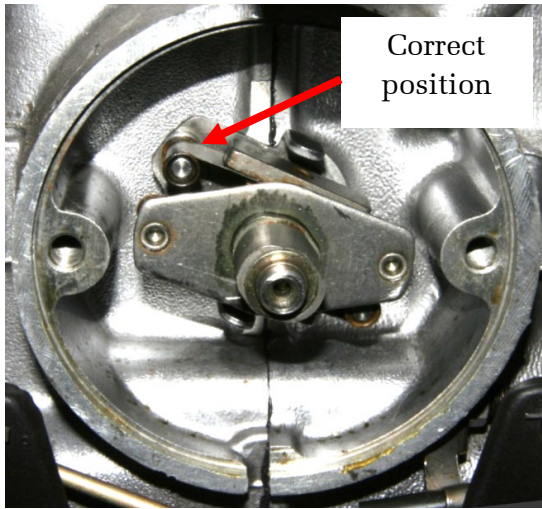


Photo 19

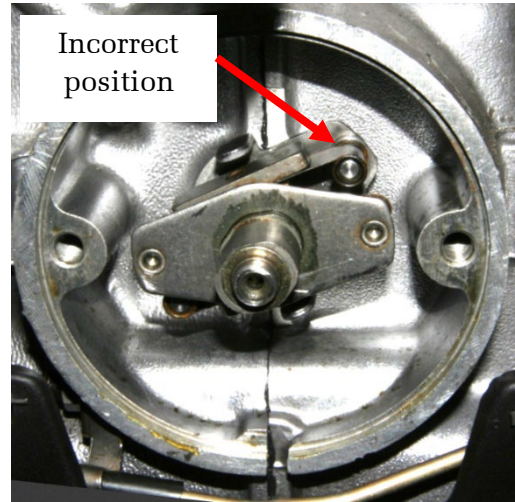


Photo 20



Photo 21 Points cam at rest.
Note position of centrifugal weight (arrowed).

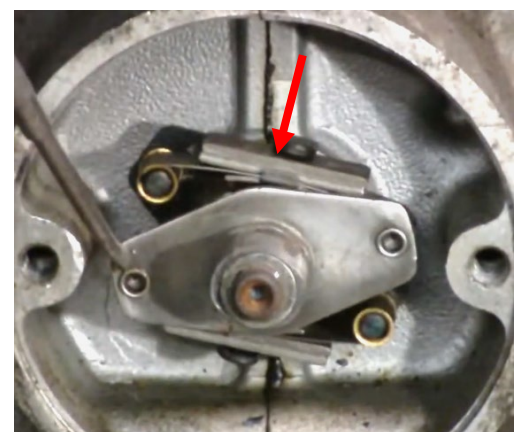


Photo 22 Points cam manually rotated 15° anti-clockwise (advanced).
Note centrifugal weight position (arrowed).

5. Photo 19 shows the *correct* fitting of the weights and springs. When the weights move outwards from the centrifugal force as RPM increases, the points cam is rotated anti-clockwise, advancing the spark timing. *We want this arrangement.*

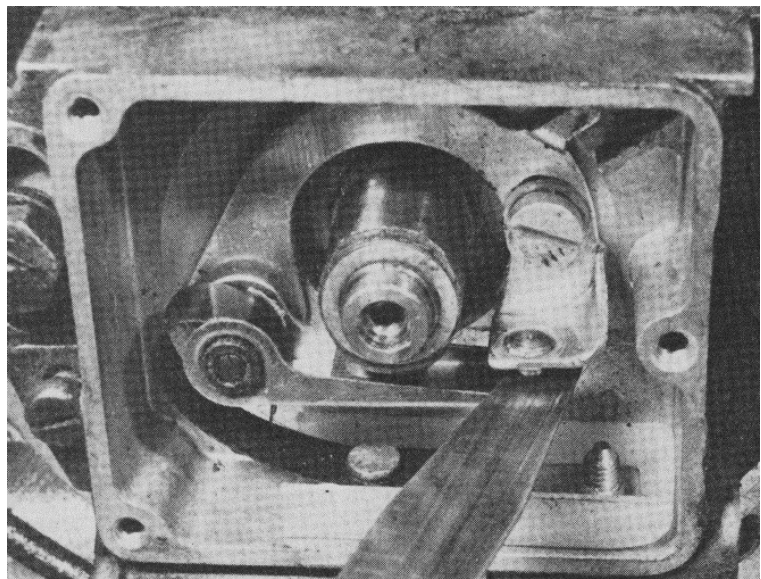
Photo 20 shows the *incorrect* fitting of the weights and springs. When the weights move outwards as RPM increases, the points cam is rotated clockwise, retarding the spark timing! *We don't want this arrangement.*

6. For background, during the running of the 2CV engine, the crankshaft rotates clockwise when looking at the front of the motor (the crank handle also turns clockwise), while the camshaft rotates anti-clockwise. This means the points cam assembly in photos 19 to 22 rotates anti-clockwise. With the springs and weights correctly fitted as intended, they will appear as in photo 19.

7. Photo 21 shows the points cam and centrifugal weights at rest, as they would be at idle. Photo 22 shows the effect of increasing the engine speed, which causes the centrifugal weights to be thrown outwards. At the maximum throw-out RPM (1500 *camshaft* RPM), when the points cam is rotated anti-clockwise (advanced) by 15° with respect to the camshaft, the engine ignition timing with respect to the crankshaft has been advanced by 30° at 3000 *crankshaft* RPM, for a total ignition timing advance of 8° + 30° = 38° before top dead centre (BTDC) at 3000 crankshaft RPM, i.e., 8° of advance due to static timing plus 30° of advance due to the mechanical weights for a total advance of 38°.

As background, the camshaft turns at half the crankshaft speed, so 15° of advance with respect to the camshaft translates to 30° of advance with respect to the crankshaft. Because the engine static timing at the crankshaft is set to 8° BTDC, which is also at idle RPM, the total (effective) ignition timing advance being applied with respect to the crankshaft at the maximum throw-out position of the centrifugal weights is therefore 8° + 30° = 38°. Thus, the spark plugs fire when the crankshaft is positioned at 38° BTDC at the RPM of maximum timing advance, which is 1500 camshaft RPM or 3000 crankshaft RPM, per pages 53-54 of the Citroen Repair Manual Part 1 for the M28/1 engine with camshaft Advance Curve C and initial (static) advance of 8° BTDC. At crankshaft RPM greater than 3000, the maximum mechanical (centrifugal weight) advance remains at 30°, set (limited) by the two limit stop tabs shown in photo 11, which set the maximum weight throw-out positions and thus the maximum anti-clockwise rotation of the points cam with respect to the camshaft.

8. Gather the points box and its associated parts and, using the previous figures and photos, assemble the points box with its components, guided by photos 18 and 21. Add a thin finger wipe of grease to the points pivot before fitting the points. Note that the points, the capacitor, the electrical spade connector and the nylon fittings are all held in place by a single screw and washer at lower right corner of the points box.
9. Check that the points moving arm moves freely, and the spring on the moving arm allows free movement of the arm. Add a thin finger wipe of grease around the points cam lobes.
10. Noting the required orientation of the points box protector plate per photo 3, place the protector plate in position over the points cam assembly, and while holding it in place, position the points box over the protector plate. While holding the plate and the points box in position, fit the two bolts and washers to hold the items in position but which still allow the points box to be rotated by hand in its housing.



*Photo 23 Setting the points gap with a feeler gauge
(Courtesy of Haynes Publishing)*

11. Adjust the points gap to 0.4 mm using the feeler gauge, then tighten the points locking screw and washer. The feeler gauge should be a firm sliding fit, not a tight or loose fit.

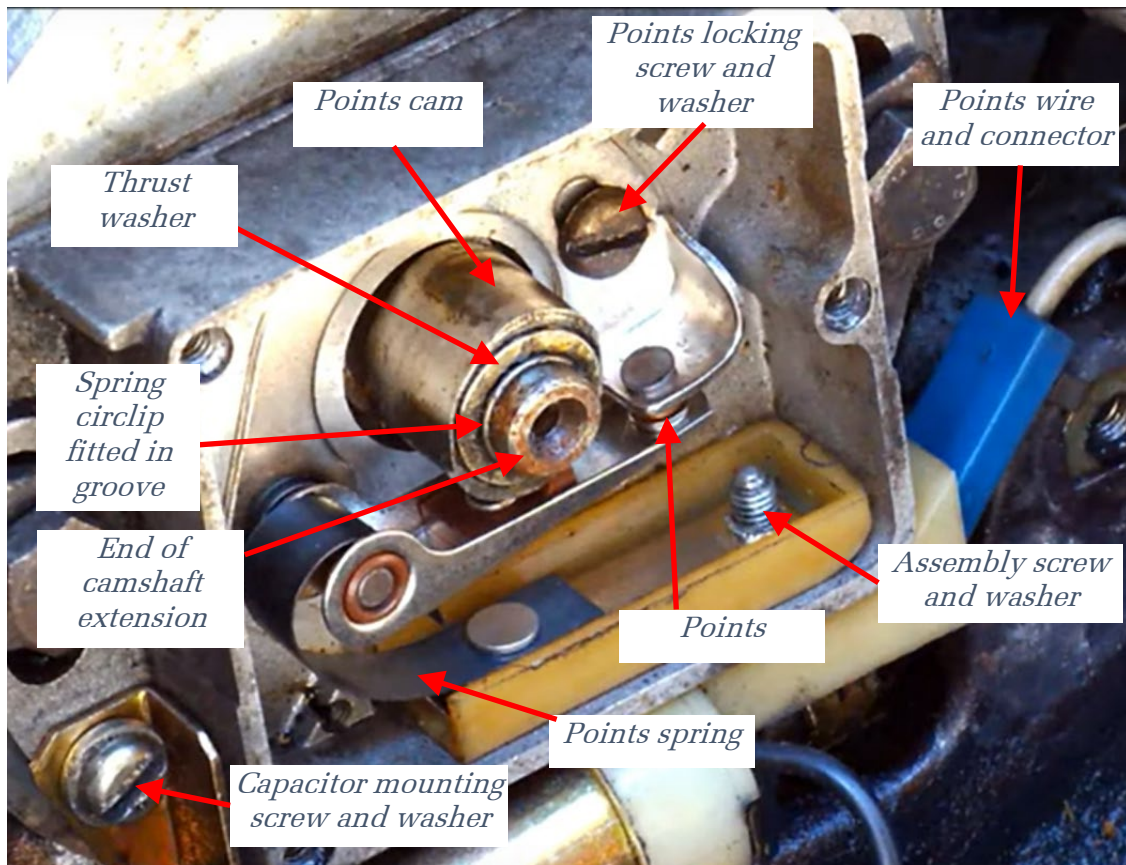


Photo 24 Better view of spring circlip, thrust washer and points spring

Step 3: Set the Engine Static Timing

1. Set the crankshaft to its static timing position of 8° BTDC by inserting the 6 mm pin or drill into the engine casing opening, then rotate the crankshaft until the pin is able to be pushed through to engage with the matching opening in the flywheel, indicating the crankshaft is at the correct static timing position of 8° BTDC.
2. **Remove the pin but don't rotate the crankshaft.** If the crankshaft should rotate ever so slightly, repeat the previous step.
The points box and its circular housing are going to be rotated to the position where the points are *just* opening, i.e., to where the resistance across the points has just changed from low resistance to high resistance. During engine operation, that is the moment when the spark is produced to fire the spark plugs. Let's do it.
3. **Turn off the ignition switch.**
4. Set the multimeter to its lowest resistance (ohms) range (or else to Ohms if the meter is auto-ranging) and connect one lead of the multimeter to the points box spade connector and the other lead to the points box housing (ground).
5. When the points are closed, the multimeter should indicate a very low resistance (less than an ohm), whereas when the points are open, the resistance should be very high (open circuit). Starting with the points box in its maximum anti-clockwise position, where the multimeter should be showing a *low resistance* reading, slowly and carefully rotate the points box clockwise to where the measured resistance reading *just* changes to a high resistance reading. You may need to repeat this a few times to set the points box as closely as you can to the low-to-high resistance transition point. Holding the points box in that position, tighten the points box mounting bolts and washers.
6. Disconnect the multimeter from the vehicle.

7. Connect the points wire and connector to the points box spade connector.
8. Connect the +12V wire from the ignition switch to the “+” terminal on the ignition coil primary winding and connect the wire from the points box to the “-” terminal on the ignition coil primary winding.
9. Start the engine and confirm all is fine, and if so, stop the engine. (Don’t run it for more than say five minutes without the fan.) Should the engine not want to start or idle, repeat from Step 2: Install the Points Ignition, rechecking all the steps.
10. Fit the points box cover and gasket and the three screws and washers.
11. Refit the rubber shield, metal brackets and the seven bolts and washers, the fan and bolt and washer, and finally, the grille and four bolts and washers.
NOTE: Don’t operate the vehicle without the rubber shield. Doing so will greatly reduce air flow over the engine barrels and through the oil cooler, impacting the engine cooling.
12. All done. You should now be able to return to the road. Ah, that’s better!
13. At your earliest convenience, readjust the points gap with a dwell meter to $109^\circ \pm 3^\circ$ (or $60\% \pm 2\%$), then readjust the ignition timing to 8° BTDC at idle (800 to 850 RPM) with a strobe timing light.

A Concluding Note:

The writer suggests that:

1. *Ahead of time*, purchase new points and capacitor and store in a sealed plastic bag with the spares kit. This will ensure a successful outcome on the side of the road. Don’t reinstall previously used (a.k.a. worn or faulty) parts.
2. *Ahead of time*, if the points wire was removed from your 2CV when electronic ignition was fitted, refit the points wire, correctly terminating it at both ends with the respective connectors: an insulated spade socket at the points box end and an insulated bullet socket at the ignition coil end. Ensure the wire is long enough for the task. Secure the points wire to the three 123 ignition unit wires with small cable ties.
3. *Ahead of time*, check that the metal protector plate shown in Photo 3, which fits behind the points box, hasn't been distorted due to previous over-tightening of the two points box securing bolts. If it has, it can cause the protector plate to come into contact with the weights or the weight pivots, interfering with the proper operation of the mechanical advance weights. Ensure the protector plate seats correctly and clears the weights and pivots.

LIST OF ARTICLES BY THE WRITER

The articles written by the writer, listed below, may be freely downloaded from either of the following club websites by clicking on the adjacent links and locating the articles. Both websites maintain the latest revisions of the articles. Before using the articles, please ensure the latest revisions are being used, as the articles are updated on an as-required basis by the writer and given new revision numbers.

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29. Better Fuel Hose Clamps – **applies to all vehicles**
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FINAL STATEMENT

My acknowledgement and grateful appreciation is given to Haynes Publishing Group for granting permission to use Figs. 1 and 2 and Photo 23, which are drawn from the book: *Citroen 2CV, AMI & Dyane Owners Workshop Manual*, 5th Edition, 1990.

ISBN 1-85010-693-2 <https://haynes.com/en-gb>

This book is a fundamental reference for 2CV maintenance and repairs and is highly recommended.

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