

Clocks4Classics Tachometer Repair Kit

Fitting Instructions for Smiths RVI Type Tachometers
(later 'Gen 2' type with bullet connectors)



Easy fit design:

- No Soldering
- Neatly replaces existing circuit board, using same screws
- Fit from rear - no need to remove dial and needle
- On board, push button calibration - no computer or phone required
- Suitable for positive and negative earth cars, no extra parts needed
- Suitable for 4, 6 and 8 cylinder cars
- Tacho-generator no longer needed
- Step-by-step instructions with clear pictures
- Online videos show how it's done

Contents

1. General Information.....	2
2. Fitting the Repair Kit.....	3
3. Calibrating the Tachometer.....	6
4. Installing the Tachometer in its Case.....	7
5. Installing the Tachometer in the vehicle.....	7
6. Trouble Shooting Chart.....	8

1. General Information

These instructions cover fitting the Clocks4Classics Tachometer repair kit to a later type (“Gen 2”) Smiths RVI type tachometer (“tacho”). The kit replaces the existing tachometer electronics and can be used on 4, 6 or 8 cylinder engines. It can be configured for use on positive or negative earth vehicles and is suitable for use with contact breakers or electronic ignition. The kit has a built in three point calibration mode and does not require the use of a computer or phone for calibration.

RVI type tachometers have “RVI” marked in small lettering on the dial. The later type can be identified by the fact that the ignition coil wire is connected by two bullet connectors on the back of the unit. Earlier (“Gen 1”) units have the ignition coil wire looped through a sensing transformer on the back of the case.

If you have an RV type tachometer or an earlier RVI unit please see separate instructions available on our website.

Kit Contents

- Replacement rear circuit board and wiring
- 2 x wire connectors
- Template for drilling wiring hole.

Anti Static Precautions

As with any electronic parts, the circuit board can be damaged by static electricity. To avoid damage to the circuit board it is important to take the following precautions when handling the circuit board:

- Keep the circuit board in its anti-static packaging until you are ready to fit it.
- Before you open the anti-static packaging, discharge yourself by touching some grounded metalwork such as a water pipe or radiator pipe.
- Handle the circuit board by the edges and avoid touching the components on the board.
- Avoid contact with materials such as synthetic fibres or wool which generate static electricity

IMPORTANT NOTE – Ignition Coil Supply

On RVI Gen 2 tachos, the supply to the ignition coil runs through the tacho itself. When the tacho is removed from the car this connection is broken and so the coil will have no supply and the engine will not be able to run.

The tacho will have a supply from the ignition switch running into the tachometer and a feed to the ignition coil running out of the tachometer. To allow the engine to run with the tacho removed these two wires must be connected together on the car side. The wires are usually white and are usually connected to the tacho by two bullet connectors (one male and one female) so they can simply be plugged together on the car’s wiring harness. The repair kit circuit board does not use this wiring and so the wires should be left plugged together on the car wiring harness when the tachometer is re-installed.

2. Fitting the Repair Kit

2.1 Remove Bezel and Glass

Rotate bezel until tabs on bezel align with slots on tachometer case. Remove bezel, glass and shading ring as shown.

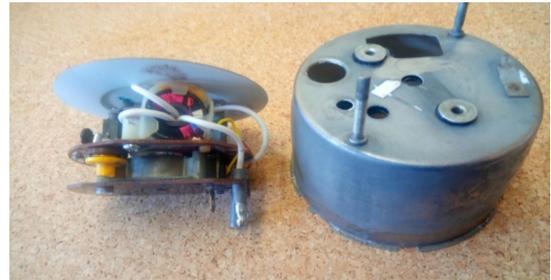
Note: the bezel may have corroded in place and be difficult to remove. In this case apply penetrating oil to the joint between the bezel and case. After leaving the penetrating oil to soak in use a small screwdriver to gently ease the edge of the bezel away from the case (do not use excessive force – just enough to break the bond).



2.2 Remove Tacho From Case

Support front of tacho with one hand. Turn tacho face down and remove two securing screws from rear of case.

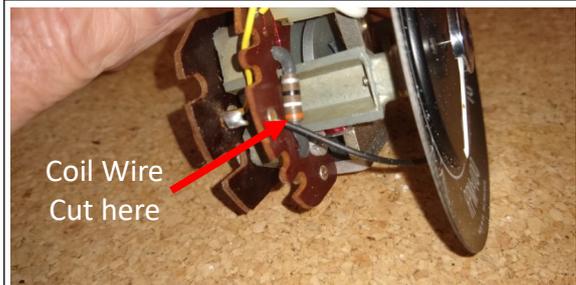
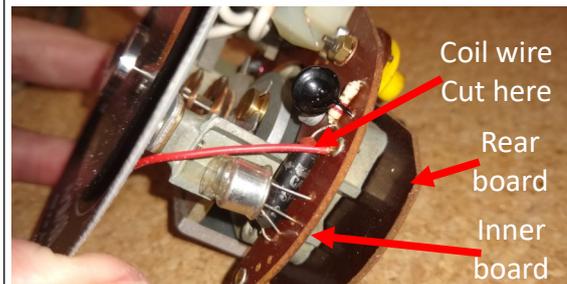
Once screws are removed turn tacho over and remove the movement from the case.



2.3 Identify and Cut Tacho Coil Wires

The tacho has two circuit boards a rear board which will be replaced by the circuit board from the repair kit and an inner board. The inner board remains in place but is no longer used.

Identify the two wires which run from the inner circuit board to the tacho coil behind the dial. Once you have identified the two wires cut them close to the middle circuit board as shown (note: the red and black wire colours may be interchanged on some tachos)



2.4 Remove the Bullet Connectors

Ease the two bullet connectors out of their slots in the rear circuit board



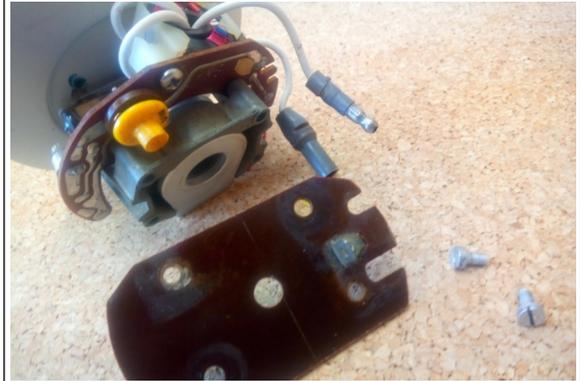
2.5 Disconnect Wiring from Rear Circuit Board

Cut the yellow wire which joints the rear circuit board to the middle board. Make the cut as close as possible to the middle board.



2.6 Remove the Rear Circuit Board

Undo the fixing screws and remove the rear circuit board. Retain the screws for future use.



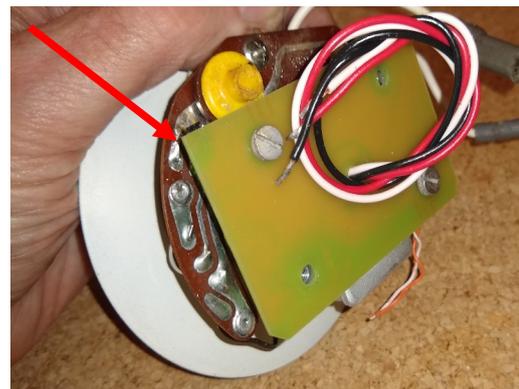
2.7 Remove the Old Ignition Wiring

Cut the white wire which loops through the sensing coil and remove the white wire completely.



2.8 Fit the Replacement Circuit Board

Fit replacement circuit board from repair kit to rear of tacho movement. Note that square corner of board is located at top left (arrowed). NB. If necessary bend the orange and white wires out of the way so that they are not trapped underneath the circuit board.



2.9 Connect Tacho Coil Wires to New Circuit Board

Note: the connections are made with the supplied Insulation Displacement (IDT) connectors. Do not strip the wires when using these connectors. Insert each wire fully into connector hole so that it reaches the top of the connector. Squeeze button with pliers and make sure **that all of the button** is completely flush with the connector body to get a good connection.

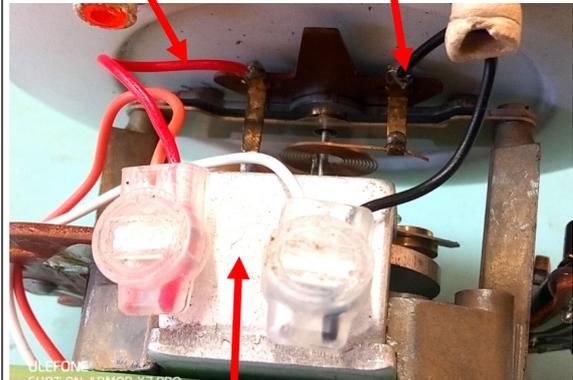
Make sure the tacho is orientated as shown in the photo with the new circuit board at the bottom and the magnet pole piece facing you.

Using the IDT connectors, join the **left** coil wire to the **orange** wire from the circuit board and the **right** coil wire to the **white** wire from the circuit board. **Do not rely on the coil wire colours** as red and black may be interchanged – join left wire to orange and right wire to white.

Tuck wires neatly to one side as shown. Make sure that none of the wires are in the way of the moving parts and that the needle can move freely. It is a good idea to secure the wires and connectors with some superglue to prevent rattles.

Left coil wire
- connect to
orange wire

Right coil wire -
connect to white
wire



Magnet
Pole Piece

3. Calibrating the Tachometer

Before fitting the tacho back into its case it needs to be calibrated. The calibration is straightforward and is best understood by watching the calibration video at <https://www.clocks4classics.com/instructions.html>. If you do not have access to the video please follow the steps below:

3.1 Setting up for Calibration

(1) Connect the red (+) and black (-) wires that exit from the rear of the new circuit board to a suitable 12-volt supply such as a car battery. Do not connect the white wire. Do not use a battery charger or phone charger as a power supply as these will not work and may cause damage.

(2) Identify the calibration button. This is a small tactile button located at the top left corner of the circuit board (the corner without a chamfer).

3.2 Calibrating the RPM Scale

Hold down the calibration button for at least 5 seconds and then release it. After a short delay the tachometer needle will start to move very slowly. Note that it may be up to 30 sec before the movement begins.

You can slow the needle movement by quickly pressing and releasing the calibration button. This can be used to slow the needle down as it approaches each calibration point (see next steps).

When the needle reaches 1000 RPM hold the calibration button down to stop the needle exactly on the 1000 RPM Mark. After 5 seconds the needle will jump forward by a small amount to show that the first RPM calibration point has been recorded.

Release the calibration button and the needle will start to move again.

Repeat step (3) for the 3000 RPM mark and for the 5000 RPM mark.

3.3 Setting the Number of Cylinders

Once the RPM scale has been calibrated release the button. The needle will return to zero and then repeatedly move round the scale stopping at 1000, 3000 and 5000 RPM and then back to zero. These three points represent the three possible cylinder choices. By stopping the needle at one of these points you can select the correct number of cylinders for your car:

- If your vehicle has 4 cylinders hold down the button at 1000 RPM
- If your vehicle has 6 cylinders hold down the button at 3000 RPM
- If your vehicle has 8 cylinders hold down the button at 5000 RPM

When you have chosen the required number of cylinders the needle will jump forward again to confirm the selection.

3.4 Setting the Signal Polarity

Once the number of cylinders has been set release the button and the needle will return to zero and then move repeatedly to 1000 and 5000 RPM.

- If your vehicle is negative earth with contact breakers **OR** negative earth with electronic ignition **OR** positive earth with electronic ignition you should hold down the button at 1000 RPM.
- If your vehicle is positive earth with contact breakers hold down the button at 5000 RPM.

Once you have made your selection the needle will jump forward. Release the button and the needle will return to zero. You should then disconnect the battery or power supply and the calibration is complete.

The calibration is now stored in the circuit board memory but if you need to change the calibration you can re-calibrate the unit at any time by repeating the steps above.

4. Installing the Tachometer in its Case

4.1 Remove the Earth Strap

Temporarily remove Rubber gasket from inside of tachometer case and retain for re-fitting.

Cut away and discard metal earth strap from rear of case.



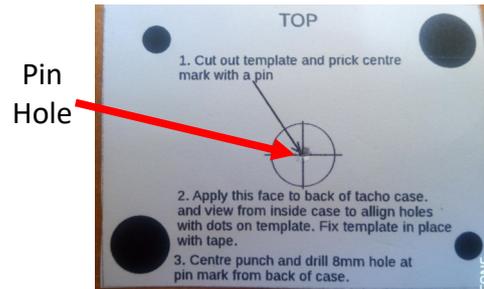
4.2 Drill the Wire Exit Hole

Take the supplied template and make a pin prick through the paper at the marked hole centre.

Place the template print side down on the rear of the tachometer. Make sure that the edge marked 'TOP' is at the top of the case. View inside the case and align the dots on the template with the holes in the case. When position is correct secure the template with tape.

Turn case over. Centre punch and drill an 8mm hole at the pin mark. Make sure that the hole is de-burred and free from sharp edges.

NB. When drilling the hole take suitable precautions to make sure that the case does not spin and cause injury.



4.3 Refit the Tachometer into its case

Replace the rubber gasket on the inside of the case. Thread Red black and white wires through back of case and secure movement in place using screws removed previously.

Refit the shading ring, bezel and glass to the front of the tachometer. If the bezel gasket is damaged or worn you can replace it with foam rubber cord (cut cord to length and join with superglue).

If there are any exposed holes in the rear of the case you can seal these with metallic tape.



5. Installing the Tachometer in the vehicle

Please refer to separate vehicle installation instructions available on the instructions page of our website at www.clocks4classics.com

6. Trouble Shooting Chart

Problem	Probable Cause	Action
Needle does not move when calibration button pressed	Button not held down for sufficient time or not released	Hold the button down for at least 5 sec and then release it.
	Not waiting for sufficient time for needle to move	The needle may not move for some time after the button is released – wait for at least 30 sec.
	Not correctly connected to power supply. Or wrong type of supply.	Make sure the red & black leads which exit the back of the new circuit board are connected to a suitable 12V power supply (Red to positive and black to negative). Use a car battery or regulated bench power supply. Do not use a battery charger or phone charger.
	Needle jammed	Check that the needle can move freely. Move wiring out of the way of moving parts and make sure that needle is not touching against the dial.
	Poor connection at wire connectors	Check that the wires are pushed to the end of the connectors and that the connector “button” is fully pressed down around its whole circumference.
	Tachometer coil connections the wrong way round	Check that the connections to the orange and white wires are as shown on page 5. If necessary re-make connections.
	Tachometer coil wires not connected or coil broken.	Check that the red and black wires to the tachometer coil are still soldered in place. If wires are connected OK use a multimeter to check the coil itself (if the resistance is more than 500 Ohms the coil is broken).
Needle moves during calibration but does not move when tacho is installed in the vehicle.	Supply wires not correctly connected to vehicle.	Check that the red and black wires from the tacho have a good connection to the vehicle’s electrical system as shown in the vehicle installation instructions. Check that the red wire is at +12V and the black wire is at 0V when the vehicle’s ignition switch is on.
	Incorrect connection to vehicle ignition coil.	Check that the white wire from the rear of the tacho is connected to the correct terminal of the ignition coil as detailed in the vehicle installation instructions. If unsure swap the wire to the other coil terminal.
Tacho needle moves in vehicle but reading is incorrect.	Not calibrated or calibrated incorrectly	Refer to the calibration instructions on page 6. Re-calibrate the tacho being sure to specify the correct number of cylinders and correct signal polarity. If unsure about the signal polarity try the other setting.