Parts & Engineering for Italian Cars

FARRINGDON

The RCA50 Series of Tachometers

Installation and Operation Instructions

Revision 3

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1. Introduction

The Farringdon RCA50 Series of tachometers are believed to be the first available with stepper motor driven main and tell-tale hands. The tell-tale hand is a very useful feature especially when used in its auto-reset mode and not just an extra hand to make it look more like historic chronometric types.

Please read these instructions carefully and make sure that the tacho displays the correct rpm—if set up incorrectly, it is likely to show double or half the rpm but it is possible to set it up so that it shows 4/5th of the true rpm which might be very expensive!

Outline Specification

Supply Voltage	7 to 16 volts DC. Below 10 volts hand speed is reduced
Trigger Pulse	5 to 100 volts. Pulse width greater than 10 microseconds
Supply Current (mean)	Less than 250 mA without shift lights, less than 300 mA with shift lights
Accuracy	+/- 100 rpm or 1%

2. Fitting Your Tachometer

2.1 Mounting the Tachometer

The RCA50 tachometer is 80 mm in diameter and the hole in your dash should accept this diameter. It will require 60 mm behind the dash to accommodate the depth of the instrument and the clamping studs.

An 'O' ring is supplied that may reduce vibration a little if it is fitted behind the bezel. Also it will provide a compliance for the clamp to work against. If the dash is wood, then it is probably unnecessary and will prevent the bezel from seating on the dash neatly.

In order to keep the overall depth of the instrument as small as possible, the mounting studs are relatively short and therefore the U shaped clamp may have to be trimmed to accommodate thick dash boards. The U clamp is steel but is easy to cut.

2.2 Connecting the Tachometer

The tachometer is supplied with flying leads so that you can fit the connector of your choice to the car loom. The table lists the functions of the five free wires.

Wire Colour	Function	Connect To
Black	Ground or Earth	Ground or Chassis
Red	12 volt Supply	A fused 12 volt supply from the master switch or Ignition if there is no master switch
Violet	Trigger input	Negative side of coil or to dedicated tacho output from engine ECU
Orange Or Grey	Shift Light 1 Output	Supplied shift light ONLY
Blue	Shift Light 2 Output	Supplied shift light ONLY
Orange	Backlighting	Lighting 12 volts

Black and Red Wires

Connect the black wire to a good earth point and the red to a suitable switched and fused 12 volt supply. A fuse of 1 amp is sufficient. The tacho requires a few seconds to power up so connecting it to the master switch is preferable to the ignition supply.

On powering up, the tacho drives both hands backwards into stops. After this the tell-tale hand moves to the maximum rpm recorded since it was last reset.

Violet Wire

The trigger input can be connected to the switched end (-) of the coil but if there is a dedicated tacho pulse from the ignition system this would be better. If you are using a modern engine management system, you may need a 3.3 K resistor between this wire and +12 volts. If you have a rev. limiter fitted, then it is much better to provide a separate trigger that is independent from the ignition. When the engine is running faster than the rev. limiter should allow (on a change down at too higher road speed for example), the ignition pulses are very irregular and will cause the tell-tale to record a incorrect (usually off the scale!) figure. Apart from alarming you, you will not be able to make sensible decisions about any damage that may have been caused to the engine.

Please contact Farringdon for advice on sensors that you can fit to your engine for this purpose.

Blue and Grey Wires

Connect these wires to the red wire of the shift light. Connect the black or blue wire to ground. The shift light outputs are positive 5 volt, 50 mA signals that are designed to drive the LED shift lights supplied with the instrument. Do not connect filament type lights to these outputs—it will not drive them!

Orange Wire

Connect this to the lighting supply. This should be a supply that switches to 12 volts when the lights are on.

2.3 The Push Button

The push button should be mounted where you can reach it while being able to read the tacho. If other people are going to drive the car you may wish to put it somewhere hidden so that the tell-tale cannot be reset easily! The push button requires a 12 mm diameter hole. Fit the sealing cap to keep moisture out of the switch.

2.4 The Shift Lights

The supplied shift lights should be fitted where they will catch your eye while you are looking at the track or road. Try various places (holding them in place with tape) before deciding where to mount them. The black plastic bezels push into the dash from the front and are held in place when the LEDs are inserted from the back. The hole size for the bezels is 14 mm diameter.

There are five settings that must be adjusted before you can use the tacho. These are

1. the number of cylinders or pulses form the engine for every two turns of the engine
2. the mode of operation. This is mainly the tell-tale reset mode
3. the trigger pulse filter. This allows you to use a wide range of pulse widths for the trigger input.
4. the rpm at which shift light 1 comes on and
5. the rpm at which shift light 2 comes on and both lights flash.

3.1 Using the push button

Having the tell-tale hand makes setting up very easy as the tell-tale hand shows what you are setting up and the main hand shows the value of the setting. The single button is used to increase the value of the setting, with a quick push, to decrease the value with a longer push and to go on to the next setting with a push of 5 seconds. You will find this easier than it sounds!

To enter set up mode, hold the push button down and then apply the power. The tell-tale needle will move to 1 (the first set up item) and the main hand will show the currently set no of cylinders.

3.2 Number of Cylinders (tell-tale at 1)

In order to allow for uneven firing engines, Farringdon uses the number of trigger pulses in two full turns of the engine to calculate the rpm. Unless you have a special sensor, this is likely to be the number of cylinders connected to the coil you are using.

Use the push button to increase or decrease the number shown by the main hand until it is correct. Then hold the push button pressed for 5 seconds to move on to the next set up item.

3.3 Mode (tell-tale at 2)

The following table shows the value to set for the mode:

Mode	Tell-Tale	Trigger Pulse	Chromometric
0	Auto reset	Negative	No
1	Manual	Negative	No
2	Auto reset	Positive	No
3	Manual	Positive	No
4	Auto reset	Negative	Yes
5	Manual	Negative	Yes
6	Auto	Positive	Yes
7	Manual	Positive	Yes

Tell-Tale Modes

The tell-tale needle on original chronometric tachometers was mechanically pushed to the highest reading reached by the main hand. The tell-tale could be reset by pushing a small button on the side of the instrument. This is copied in the manual reset mode. The auto reset mode resets the tell-tale hand after about two seconds back to follow the main hand. This is very useful as it gives the driver time to see what the engine was revved to before or during each gear change.

Trigger Pulse Polarity

This may need to be changed to match the pulse from a special sensor. For ignition coil connected wiring set this as negative.

Chronometric Action

If this option is selected with settings 4,5,6 or 7, the tacho moves the main needle once every half second in the manner of the original mechanical chronometric movements. This action is switched off after reaching 5000 rpm for 0 to 8,000 and after reaching 6,000 rpm for the 0 to 10,000 and 12,000 versions.

Once you have adjusted the mode setting, hold the push button pressed for five seconds.

3.4 Trigger Pulse Filter (tell-tale at 3)

The trigger pulse filter sets the shortest electrical pulse to which the tacho will respond. For ignition connected wiring, set this to 10 and only reduce it if the tacho does not read over a certain rpm. For special sensor systems, set this to 1 as a first try. If the needle starts to jump up when the engine is running under load, try increasing the filter setting.

After setting the filter, push the button for 5 seconds to save the setting

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3.5 Shift Light Settings (tell-tale at 4 and 5)

The next two settings are for the shift lights. Use the push button to set the rpm at which you would like the first and second shift lights to illuminate. Remember to hold the push button pressed for 5 seconds after each adjustment to move on to the next. After the last shift light is set, the tacho will initialise as if it had been switched on.

3.6 Resetting the Tell-Tale

In auto reset mode, the maximum rpm recorded is shown after switch on and the hands have been driven into the stops. To reset this value, or the tell-tale hand when in manual mode, simply press the push button after the tell-tale reading has been shown.

Important Note

Further steps in the set up process can be skipped at any time by switching off the tacho but only the settings that have been terminated with the 5 second long push button press will be saved.

4. The Filter Unit.

4.1 Purpose

The Tacho Filter Unit is a simple filter contained in a small plastic box that may be required when using a Farringdon RCA5x Tacho with contact points ignition systems. It may be of use with some electronic systems as well. Essentially the unit filters the signals taken from the negative (on negative earth systems) side of the coil. These signals carry considerable noise from the arcing inside the distributor cap. Many other tachos have this filtering included but this prevents them from working with very short pulses that can come from directly triggering from a sensor on the flywheel.

4.2 Fitting

Mount the unit at least 25cms away from the distributor. The components in the plastic box are "potted" so it can be mounted in the engine bay.

a) Connect the violet wire of the filter unit to the violet wire of the tacho.

b) Connect the black wire of the Filter Unit to ground.

c) Connect the negative of the coil to the green or blue wire. The blue input provides more filtering than the green so start with the green wire.

d) Temporarily insulate the unused blue wire.

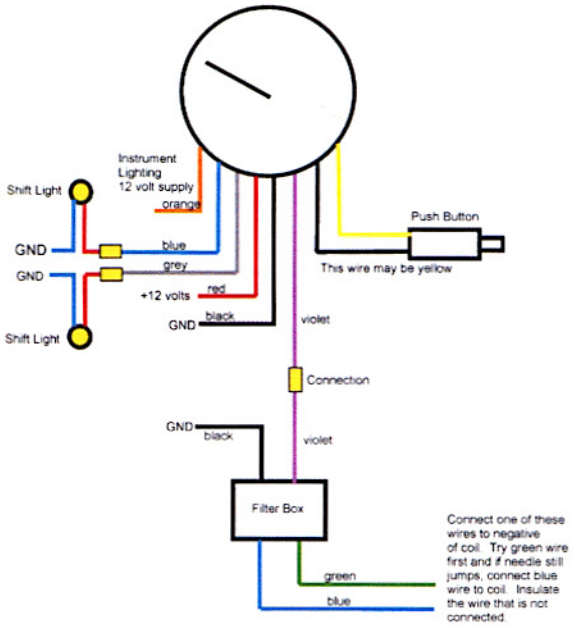
4.3 Commissioning

Set the tacho filter setting to 8. See Section 3.4 for details of how this is done. Try the tacho and check that the needles do not jump about (+ or – 500 rpm or so) when the engine is held at a steady 3000 rpm. If the needle is steady, try at full speed under load.

If either needle makes jumps to higher rpm when the engine is running at a constant speed, increase the filtering by connecting the trigger wire to the red instead of the orange filter wire.

If the needles are steady, then try changing the tacho filter setting to 7. This will make the tacho more responsive.

Warning DO NOT rely of the tacho reading until you are certain that you have set it up correctly and that it is reading the true RPM.

5. Troubleshooting

Symptom	Possible Cause	Fix
No movement of tacho hands when turned on	No power	Check for +12 volts between red and black wire.
Tacho runs against stop on power on but shows no rpm	No or incorrect trigger pulse	Make sure that the trigger pulse is greater than 5 volts and falls to less than 0.2 volts. Set trigger pulse filter to 1
Tacho does not show correct rpm	Trigger pulse setting is incorrect	Check set up. Call Farringdon for help.
Main hand drops to 0 above a certain rpm	Filter setting is too high	Reduce filter setting
Main hand is unsteady.	Irregular trigger or too short trigger pulses.	Increase filter setting or fit Filter Unit
Shift Lights do not work	Lights wired incorrectly. Shift RPM setting wrong	Make sure the shift lights are wired correctly Black to black. Check RPM settings for Shift Lights.