FARRINGDON


# The RCA50 Series of Tachometers
# Installation and Operating Instructions

Revision 9

# Contents

# 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!

| | |
|---|---|
| Supply Voltage | 7 to 16 volts DC. Below 10 volts hand speed is reduced |
| Trigger Pulse | 5 to 100 volts. Pulse width greater than 300 microseconds |
| Supply Current (mean) | Less than 100 mA without shift lights, less than 150 mA with shift lights |
| Accuracy | +/- 100 rpm or 1% |

# 2. Fitting Your Tachometer

## 2.1 Mounting the Tachometer

The body of the RCA50 tachometer is 80 mm in diameter, the RCA51 is 100 mm in diameter and the RCA52 120 mm 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. It will also 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.

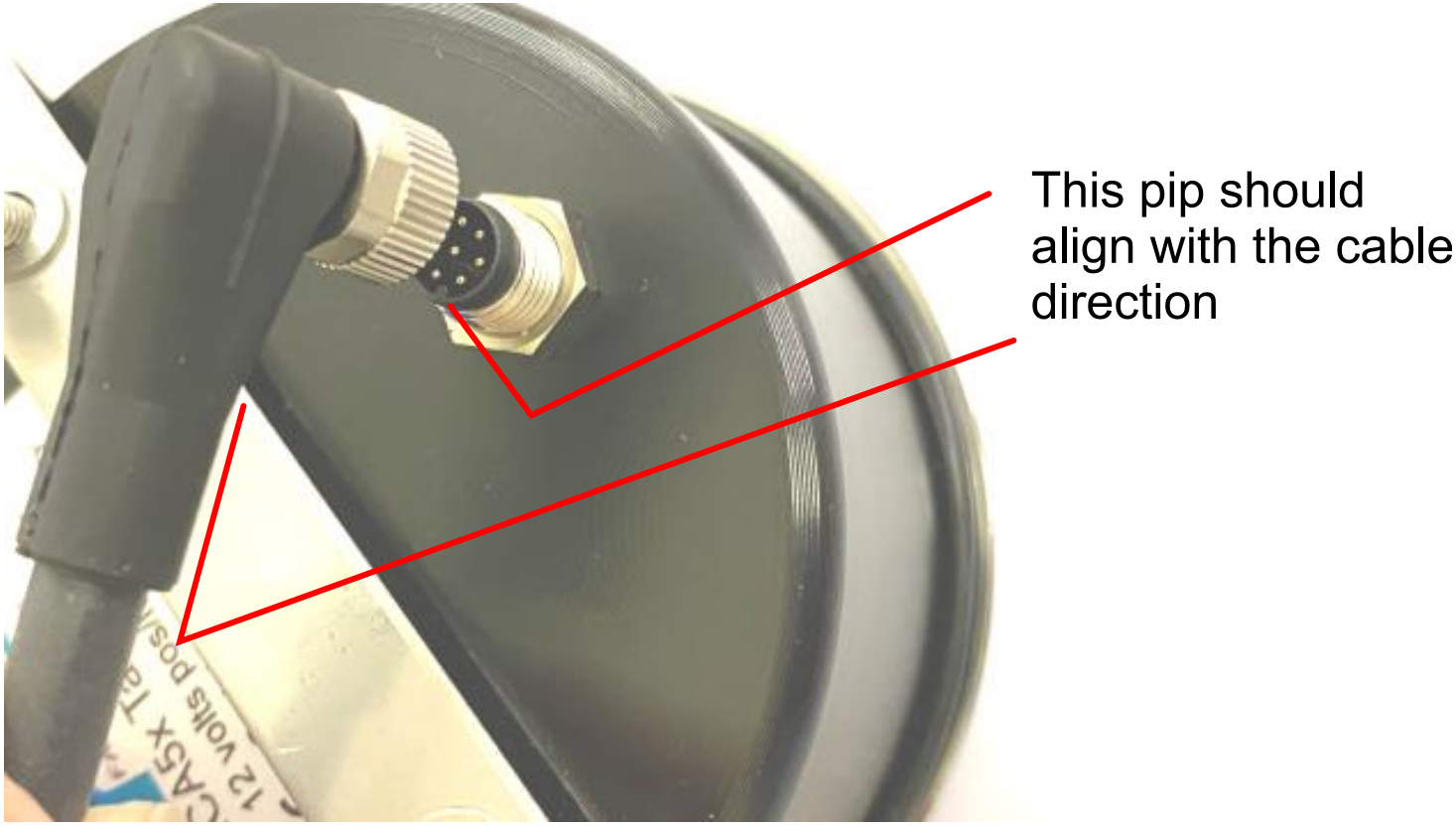
In order to keep the overall depth of the instrument as small as possible, the mounting studs are relatively short and therefore the U shaped clamp may have to be trimmed to accommodate thick dash boards. The U clamp is steel but is easy to cut.

## 2.2 Connecting the Tachometer

The tachometer has a small M8 connector on the back surface and is supplied with a mating connector and cable:

Caution

The connector pins can be bent when trying to mate the connectors – please be gentle and align the cable connector with the small pip on the inside of the plug.



# Connections Table

| | | |
|---|---|---|
| White | Ground or Earth | Connect this to a good chassis ground |
| Red | 12 volt Supply | Connect to a fused 12 volt supply from master switch (preferred) or ignition switch |
| Brown | Trigger | Negative side of coil or to dedicated tacho output from engine ECU |
| Green | Shift Light 1 or Tell-Tale Enable | LED shift light ONLY positive or 52 mm gauge tell-tale enable. |
| Yellow | Shift Light 2 | LED shift light positive ONLY |
| Grey | Push button | Connect to one side of push button |
| Pink | Push Button | Connect to other side of push button |
| Blue | Back lighting | Lighting 12 volts |

White and Red Wires

Connect the white 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 forwards and then backwards into stops. After this the tell-tale hand moves to the maximum rpm recorded since it was last reset*.

Brown Wire

The trigger input can be connected to the switched end (-) of the coil directly 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 ohm resistor between this wire and +12 volts. If you have a rev. limiter fitted and 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 an incorrect figure (usually off the scale!). Apart from alarming you, you will not be able to make sensible decisions about any

damage that may have been caused to the engine. Therefore, if you have a rev. limiter fitted, it is much better to provide a separate trigger that is independent from the ignition. Please contact Farringdon for advice on sensors that you can fit to your engine for this purpose.

If the tacho is being used with a Lucas capacitive discharge spark box, the instrument will need an internal modification – please contact Farringdon.

Green and Yellow Wires

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

Blue Wire

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

## 2.3 The Push Button (Grey and Pink wires)

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. Cut these wires to length, sleeve if you wish, fit the supplied “faston” crimps and connect to the switch terminals.

## 2.4 The Shift Lights (when 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. An 8 mm diameter hole in the dash is required for the alloy shift light housing.

## 2.5 Adjusting the M8 Connector

The moulded right angle connector supplied with the tacho leads the cable across the back of the instrument. The connector can be rotated

so that the cable runs in the best direction for your installation. With the cable connected and screwed onto the connector, loosen the securing M8 nut and gently rotate the cable up to 180 degrees one way or another. DO NOT rotate the connector more than 180 degrees. Once in the correct position re-tighten the nut.

This nut tightens the connector against a small O ring on the inside of the instrument. DO NOT over tighten!

## 3. Setting Up Your Tachometer

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

1. The number of cylinders or pulses from the ignition 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 the rpm at which shift light 2 comes on and both lights flash.

To revert to factory setup, enter setup mode by turning on the tacho with the button pressed, release the button and then press it again for 20 seconds.

## 3.1 Using the push button

Having the tell-tale hand makes setting up very easy as the red tell-tale hand shows what you are setting up and the white main hand shows the value of the setting. The button is used to increase the value of the setting, with a quick push, to decrease the value with a push of about 2 seconds and to go on to the next setting with a push of 5 seconds. You will find this easier than it sounds!

In the following paragraphs, numbers refer to the first digit on the tacho scale; e.g. when setting the cylinders to 4, the white hand has to be set to 4000 rpm however this is marked, maybe 4 or 40.

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. When the needles have stopped moving, release the button.

## 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. This is usually the number of cylinders.

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.

Note. If the red hand indicated 1500 rpm, this shows that the number of cylinders has been set to the maximum value on the dial and has wrapped over. E.g If the red hand is on 1500 rpm and the white on 4000 rpm, then the tacho has been set to 8+4 (for a 0 to 8000 tacho) cylinders. Press the button for 20 seconds to start again from the factory setting.

## 3.3 Mode (tell-tale at 2)

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

| Mode | Tell-Tale | Trigger Pulse | Chronometric |
|---|---|---|---|
| 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 is mechanically pushed to the highest reading reached by the main hand. The tell-tale can 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 it to positive.

## 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 of the tacho.

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 4 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.

### 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, simply press the push button after the tell-tale reading has been shown. If the tell-tale is not in the auto reset mode, pressing the button at any time while the instrument is powered on will reset the tell-tale hand.

**Important Notes**

**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.**

**If you increase a setting so that it reaches the maximum on the scale, it will "wrap" round to 1 if the setting is increased again. This allows you to set up a 16 cylinder engine on a 0 to 8000 rpm dial. When this wrap occurs, the tell-tale hand steps on half a division to indicate that this has happened.**

******** To set the tacho back to the factory settings (4 cylinders, mode 4, filter 4, shift lights 7000 and 8000 rpm), enter set up mode and press button for 20 seconds.** ******

# 4. Troubleshooting

| Symptom | Possible Cause | Fix |
|---|---|---|
| No movement of tacho hands when turned on | No power | Check for +12 volts between red and white 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. Set to factory setup (start of section 3) and start again. 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. |

**To set the tacho back to the factory settings (4 cylinders, mode 4, filter 4, shift lights 7000 and 8000 rpm), enter set up mode and press button for 20 seconds.**

Notes

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