REVISITING JAGUAR CLOCK REPAIR: THE SMITHS GOLD PLATED CONTACTS CONUNDRUM

As with many of the mechanical items on our vintage Jaguars, the Smiths clocks are a true wonder of 1940s - 1960s technology. But, unfortunately, like some other Jaguar components, the clock was not reliable after only a few years of operation. Mine began its erratic timekeeping after about five years from new (1967 – 1972). It would often stop, and by readjusting the hands I could get it to work again for a time, until it finally quit for good in 1973.

When disassembled, a declaration stamped on the hidden backing plate states the clock has a four-jeweled movement. You can see pink jeweled bearing holes in two of the bearing areas, and the other two jewels are the end caps for these bearings. As long as the clock was kept operational with power from the 12 volt car battery, it could reliably run for a few years.

However, there was a weak link in the design that Jaguar acknowledged in Service Bulletin #p.44, November 1965:

> "Following complaints received concerning faulty transistorized electric clocks, investigation has shown that in the majority of cases, the fault is due to the clock not being restarted manually when the battery has been reconnected after work on the car. This results in the gold-plated contacts in the clock chattering and subsequently burning."

The bulletin then states it is essential to restart the clock by tweaking the hand setting control. There was a further admonishment to dealers in Bulletin #P.50, September 1966:

> "Despite the issue of Service Bulletin P.44 in November, 1965, it is apparent that the importance of the instructions contained therein are not receiving the attention they warrant. …It cannot be too strongly emphasized that FAILURE TO ENSURE THAT THE CLOCK IS WORKING AS SOON AS THE BATTERY IS CONNECTED WILL INEVITABLY RESULT IN IRREPARABLE DAMAGE TO THE TIMEPIECE."

Mark Willows of Clocks4Classics, which specializes in the repair, restoration and improvement of English automotive timepieces, surmises the weak contacts mechanism was even more problematic than the service bulletins indicated:

> "I am not certain that the contacts were actually that reliable even if the advice in the Jaguar bulletin was followed. I believe the contacts still wore out after a short time. There were two main reasons for this: 1) The contacts were necessarily very small, and 2) They were damaged by the arcing which occurs when the current through the solenoid is interrupted. Later versions of the movement included a diode to help suppress this arcing but this made the clock polarity sensitive and many were damaged when positive earth cars were converted to negative earth. Interestingly, an ex-employee of Smiths told me that the clocks became more unreliable when Jaguar introduced vinyl seats (e.g. in the Mk2, 240 etc.). Apparently the fumes from the plasticiser used in the seats attacked the contacts and made matters considerably worse!
>
> Strangely, the Jaguar bulletin also refers to the clock as "transistorised". I think there must have been some confusion at the time. Smiths did later produce some transistorised clocks but these did not have contacts, so I am sure that this bulletin is actually talking about the Smiths clocks like yours from roughly 1940 through the early 1970s with the "pin clock" movement."

Thus, the weak links on these clocks were in A) the design of the contacts mechanism itself, and B) the mechanic working on the car. Therefore, when attempting to repair a Smiths clock, a solution to replace the contacts mechanism is imperative. Repairing the existing weak parts is impossible, as there are no new-old-stock components available, nor can they be rebuilt after the described burn-out, and, in any event, they are not reliable in the long run.

In conducting research, I've found there are three avenues available to repair, replace or restore Smiths clocks:

- Simply rebuild, clean and oil the original movement. Due to the contacts mechanism being worn or likely burned out, this solution is short lived at best.

- Replace the movement entirely with a new digital clock. This method uses a separate battery (such as AA) and does away with the original Smiths clock and its components, other than the hands.

- Replace the faulty contacts mechanism using today's digital technology in the form of a Printed Circuit Board (PCB). This is the Clocks4Classics solution. The process only replaces the defective contacts mechanism consisting of three components and a slotted screw (see photos). The clock retains its oscillating balance wheel (which provides the wonderful, almost silent, ticking sound you may have heard if you were lucky your clock ever worked), the four jeweled movement, and "gears," officially known as the "escape wheel assembly" and "transverse wheel assembly."

  Thus, the clock becomes roughly 30% digital, but remains 70% analog with original movement. Plus, it works from your car battery, like it did 50 or 60 years ago, and it is no longer sensitive to polarity. Another advantage is you won't need to send your clock to someone else for repair; you can do it in the comfort of your shop. As a final note to this method, it is 100% reversible, should one choose to go back to the faulty parts.

My choice was to proceed with the Clocks4Classics solution. The kit is just under $100 shipped from England to your door in the U.S.A. Mark's company responded immediately to my PayPal payment and dispatched the kit the same day. It took just under two weeks to arrive.

Regardless of your choice of repair solutions, the first question you might ask is, "just how hard is it to remove the clock from a Series 1 E-Type?" (And likely the same process for other models of this era with the clock installed on the tachometer.)

It turns out this wasn't such a big job. The clock is accessible from underneath the dash, just above your right leg. First, disconnect the battery. Next, unscrew the fiberboard panel, remove the bezel securing the hand-winding mechanism, and the clock is within reach. You'll need the assistance of a hand mirror and a ¼" socket wrench with 1-1/2" extension. The clock is fastened with two ¼" nuts and star washers. Spin the hand-winder off from the back of the clock, and separate the bullet connector securing the hot wire lead. The clock will slip out. Take care with the hands, as they are delicate and exposed. In fact, it's a good idea to tape a piece of cardboard over them at this point. That part of the clock will not be disturbed in the repair process.

I needn't go into the disassembly, cleaning, repair and reassembly process, as Mark's instructions are extremely detailed and easy to follow. He provides both printed instructions in PDF format, as well as an excellent YouTube video. In fact, it was after watching the YouTube video that I decided to buy the kit.

The rebuild took precisely a week, which included four days to adjust the regulation (speed). It's prudent to wait 24 hours or so to check the accuracy and make adjustments, then wait another 24 hours and re-tweak as necessary.

The reason that it took three of the seven days to complete the rebuild was the need for a couple of trips to the hardware store for some tools, and I also had to fashion some other items, which I've detailed below. If you supply these items in advance while you're waiting for your repair kit to arrive, you can probably slice at least a day off the rebuild time.

I found that reinstallation was easier than removal. The result is a ticking clock that sounds just like I remember when it last ran…in 1973!

Following are my notes and observations on items needed for the full rebuild.

FOR REMOVAL FROM DASH:

- ¼" socket with ¼" ratchet and 1-1/2" extension. Note: I couldn't get an open end or box wrench on the nuts due to the close quarters in the dash area.

FOR REATTCHMENT TO DASH:

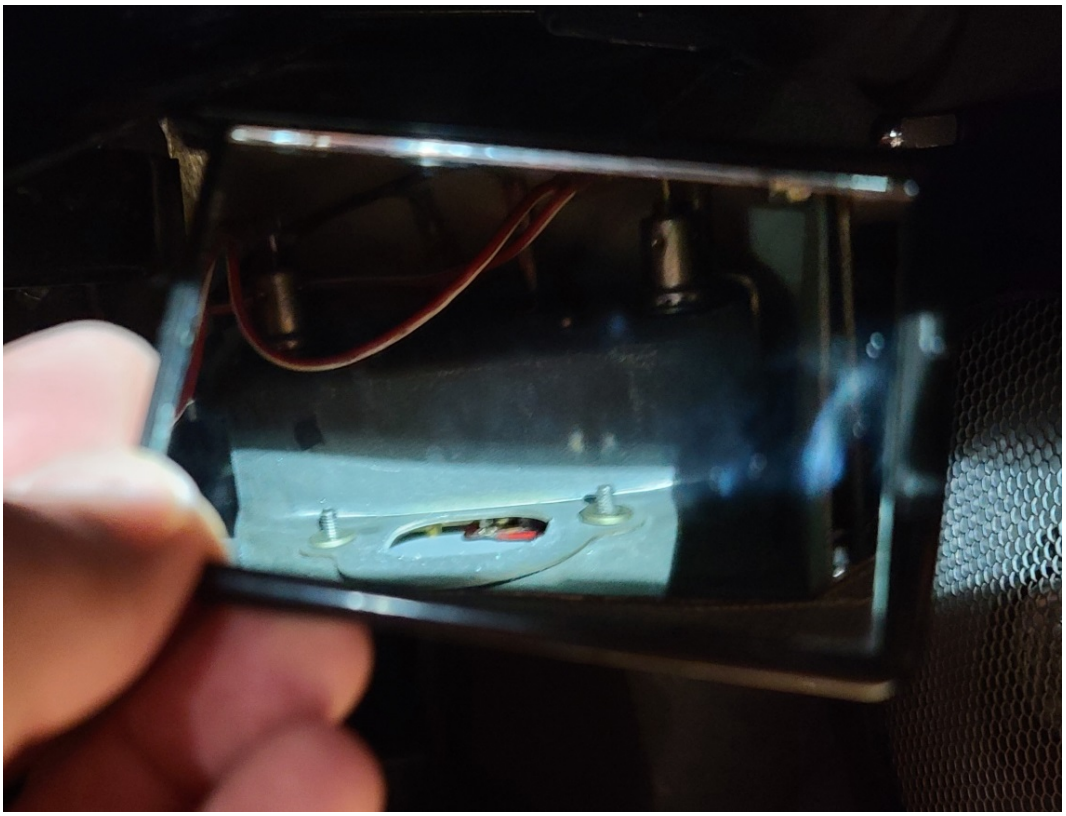
- Form-A-Gasket to adhere gasket to the clock body for maintaining alignment.

FOR CLOCK REBUILD:

- Lacquer thinner ("cellulose thinners" in British parlance). This is imperative to help ease out some tiny screws the size of sugar ants.
- 2.0mm and 2.4mm slotted jewelers screwdrivers, modified by slightly grinding down the flat edge into a sharper angle.
- Magnifying goggles
- Artist brush to apply the lacquer thinner
- 12 volt, fused +/- test wire circuit with alligator clips (described in Mark's instructions).
- 3/16" and ¼" open end or socket wrenches.
- Small wire cutters
- Super Glue
- Tweezers to handle screws
- Razor knife

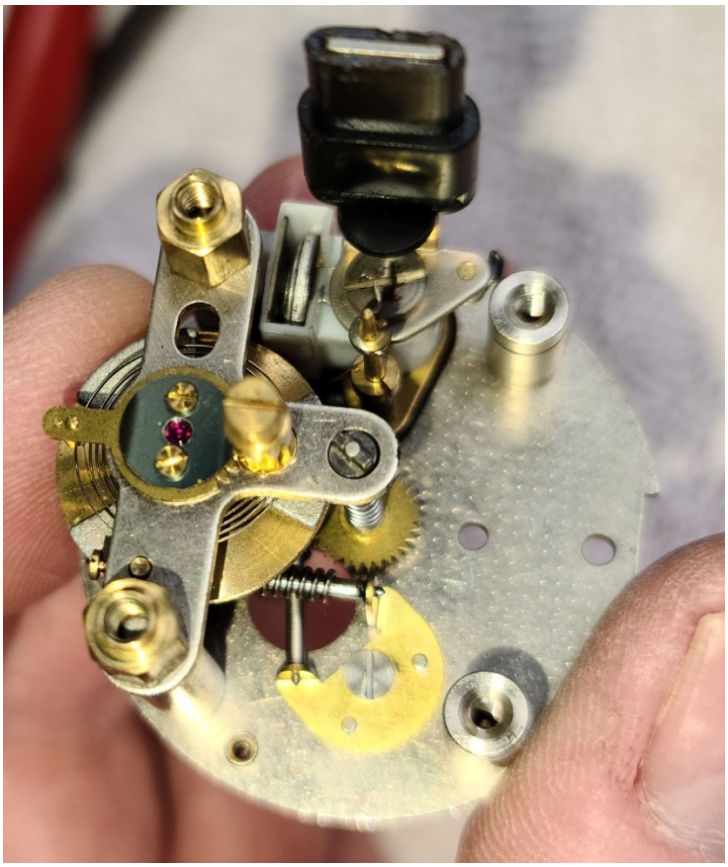
KEY OBSERVATIONS:

(1) Clock secured to tachometer as viewed from under the dash with a mirror. It can be removed from the tach with no further disassembly/removal of the dashboard or tach.

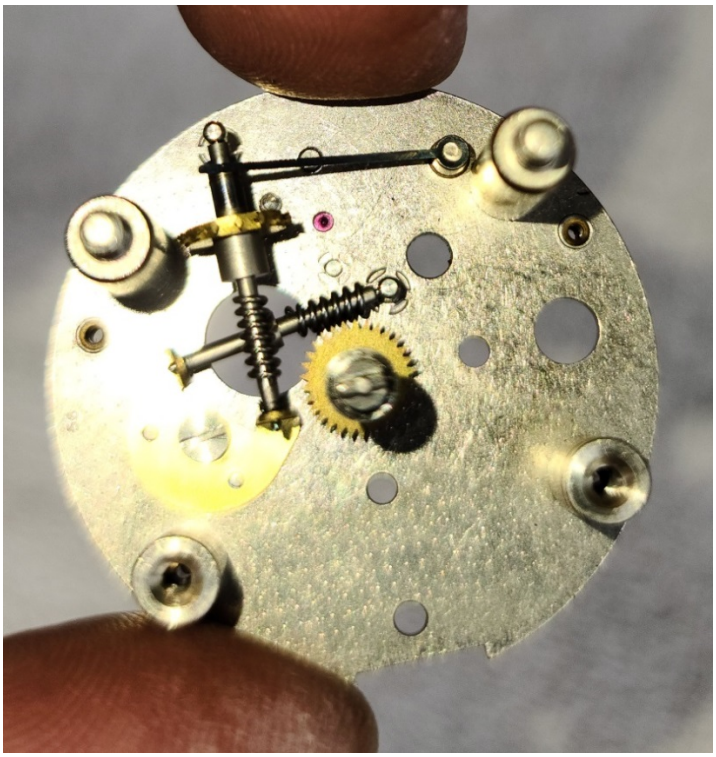


(2) The tachometer with clock removed as viewed from under the dash with a mirror.

(3) Backing plate showing “4 Jewels” declaration. The jewels remain in the rebuilt clock.



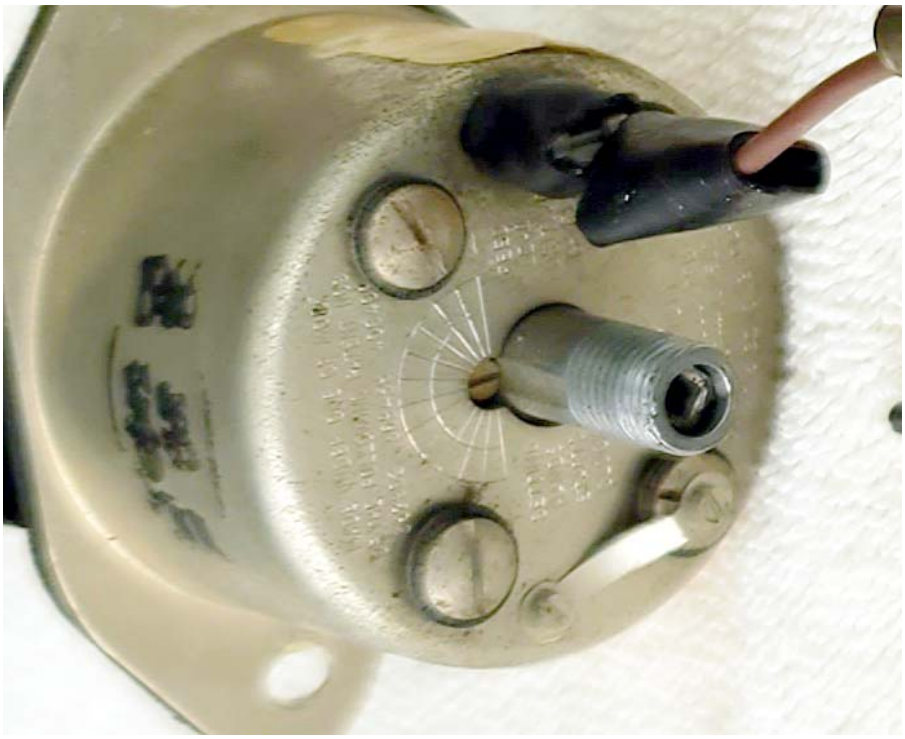
(4) Balance wheel assembly clearly showing a jeweled bearing. The old contacts mechanism is shown at top, just under the “connecting bracket” (the black, insulated male power disconnect).



(5) View of gears clearly showing jeweled bearing for balance wheel assembly.

(6) Reassembled clock with PCB board installed, replacing faulty contacts mechanism. Note that the solenoid is not shown; its reinstallation is the final task.

(7) The failed contacts and associated fittings—the weak link in the original Smiths clock. These are the parts replaced by the Clocks4Classics PCB board. Keep them if you ever wish to return to the original Smiths timepiece.



(8) Regulation (speed) adjuster is the slotted screw in center of the photo. Turning clockwise slows the clock, counterclockwise speeds it up.

(9) Reassembled clock showing speed adjustment on the bench. Note alligator clips with power directly from the car battery.

JAGUAR

SERVICE BULLETIN

Number P.44
Section Electrical & Instruments

Sheet 1 (of 1)
Date November, 1965

TRANSISTORISED ELECTRIC CLOCKS

Following complaints received concerning faulty transistorised electric clocks investigation has shown that in the majority of cases the fault is due to the clock not being restarted manually when the battery has been reconnected after work on the car.

This results in the gold-plated contacts in the clock chattering and subsequently burning.

It is therefore ESSENTIAL to check that the clock is always running when connected to the electrical supply. Failure to ensure this will effectively shorten the service life of the clock.

To start the clock, the hand setting control must be firmly depressed, held for a few seconds, and then released sharply. This can be done at the same time as re-setting the hands.

(10) Service Bulletin from 1965 identifying the contacts problem and solution.

JAGUAR

SERVICE BULLETIN

Number P.50
Section Electrical and Instruments

Date September, 1966

TRANSISTORISED ELECTRIC CLOCKS

Despite the issue of Service Bulletin P.44 in November, 1965, it is apparent that the importance of the instructions contained therein are not receiving the attention they warrant.

Abundant evidence is available that most of the trouble experienced with the transistorised electric clock can be traced to the fact that they are not being started IMMEDIATELY THE BATTERY IS RECONNECTED.

It cannot be too strongly emphasized that FAILURE TO ENSURE THAT THE CLOCK IS WORKING AS SOON AS THE BATTERY IS CONNECTED WILL INEVITABLY RESULT IN IRREPARABLE DAMAGE TO THE TIMEPIECE.

All Distributors and Dealers are requested to issue instructions to Service personnel that this small but MOST IMPORTANT operation shall be carried out WHENEVER THE ELECTRICAL SUPPLY IS RECONNECTED AFTER ANY PERIOD OF ISOLATION FROM THE BATTERY.

(11) Service Bulletin from 1966 admonishing dealer service personnel for not following through (!)

CONCLUSION:

The Clocks4Classics solution yields a reliable Smiths timepiece with most of the analog features and original movement intact. Thus, the clock ticks like it did from day one. Mark Willows and his team have been building this kit since 2012 and, as he attests, his clocks are still ticking.

If your car hibernates in the winter, Mark recommends that “you leave the clock running as this prevents any problems with the movement becoming stiff due to lack of use. The current draw of the clock is very low and you do not need to worry about it running down the battery.”

I am convinced that the Clocks4Classics solution gives the best compromise between reliability and originality. And, most important, doing the conversion yourself is extremely fulfilling.

Tom Taylor
1967 Jaguar E-Type Owner since 1971
8/6/20