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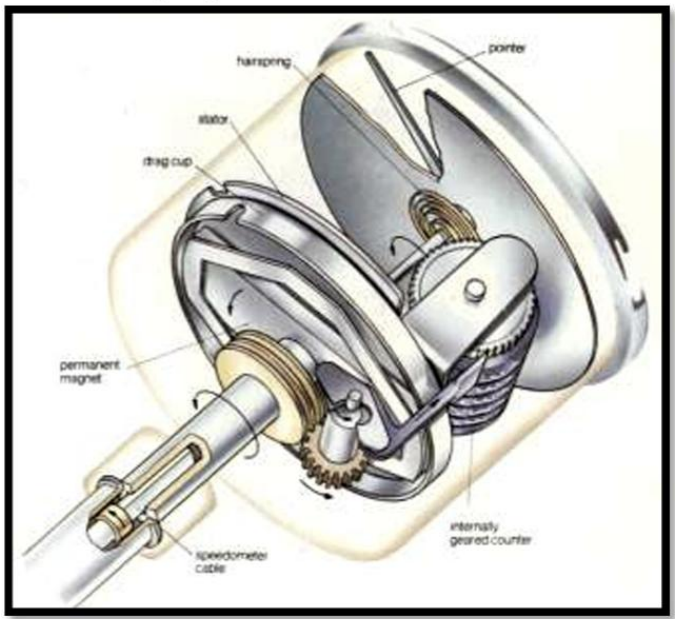
Smiths Speedometer

by Bill Unger, Newsletter Editor

Those of us with British cars in the "antique" category (generally defined as vehicles built in 1975 or earlier) may be finding that the factory-installed Smiths speedometer is beginning to act its age with a wavering needle and inaccurate readings. The number one reason for speedometer problems is a malfunctioning cable which I will not be discussing here. But if after you have assured yourself that the transmission speedometer cable gear drive, cable sheath, and core are not crushed kinked, loose, unscrewed, or otherwise damaged, then you may need to peek inside the speedometer head (aka. gauge).



Over the years dust, dirt, and bug residue may have worked its way into the innards and are now gumming up the works. Also, oils and grease may have worked up through the sheathing via the inner flex core from the transmission and turned to glue. And internal rubber seals and diaphragms may have disintegrated into a sticky goo as had happened with the gauge in my 1969 Jaguar Series II E-type. In any case, if your speedometer's fluttering is annoying to watch and the readings are unreliable, you may want to disassemble and clean it up so that it will last another 50+ years.

Removing the Speedometer Head

1) Reach under the instrument panel and remove the indicator and gauge lamps from their holders on the back. If your speedometer has Alternator (red), Low Fuel (yellow), and High Beam (blue) indicator lamps, note which sockets they fit into for proper reinstallation.

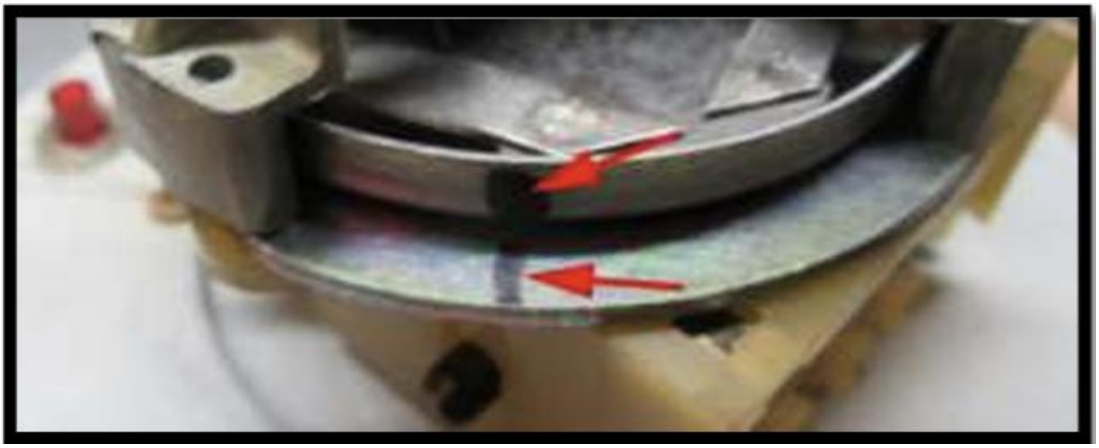
Smiths Speedometer with Cables on the Right

2) Unscrew the thumb nuts from the threaded studs holding the retaining brackets and remove the brackets.
3) Pull gauge out, unscrew speedometer drive and odometer reset cables.
4) Remove the gauge and large O-ring that seals the bezel to the instrument panel face.
5) Place gauge on a rubber jar lid gripper, push down on housing and twist. If needed, pry the tabs a bit with a small screwdriver. Rotate the housing until the bezel tabs align with notches in the housing and lift off.
6) Place the gauge upside down on a soft towel, remove the retaining screws from the back, and lift off the housing.

Speedometer Internal Works Removed from Housing

Instrument Head Disassembly

1) Make a mark on the drag cup and frame while the pointer is resting at zero to reinstall the pointer in its proper orientation without any significant loss of calibration.

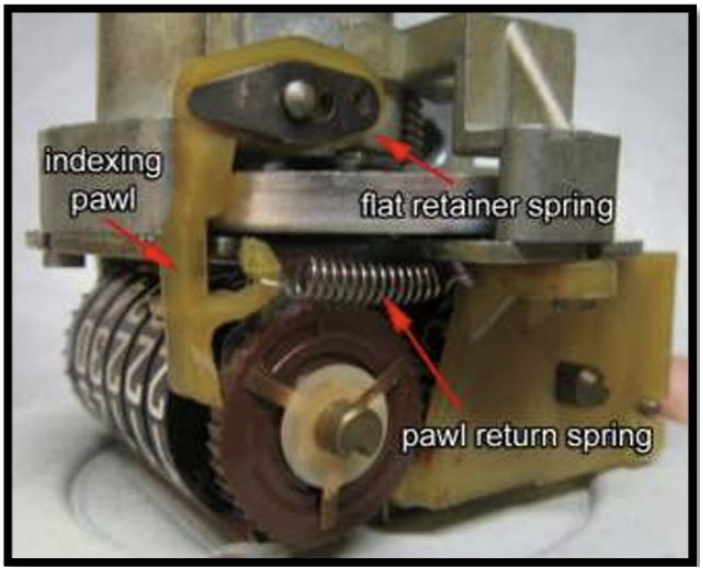


Black Orientation Marks on Cup and Frame

2) Gently turn the drag cup until the pointer is at midpoint, and hold the drag cup in place. Pull and twist the pointer by the hub until it pops free of the spindle.

3) Remove two tiny screws beside the needle spindle attaching the face to the frame.

4) Using a forceps to grip, remove the small return spring on the odometer indexing pawl. (NOTE: This spring is not present on the late style units such as that used on the SII Etype.) Slide and remove the flat spring retainer holding the indexing pawl on the main odometer.



5) Remove the four screws holding the odometer wheel set and lift off to allow access to the magnet wheel and the seat of the needle pivot.

NOTE: The two wheel sets may be separate (early, below left) or connected (late, below right, as used on the SII E-type). Separate wheel sets have two separate gears driven off the worm on the shaft of the magnet wheel.

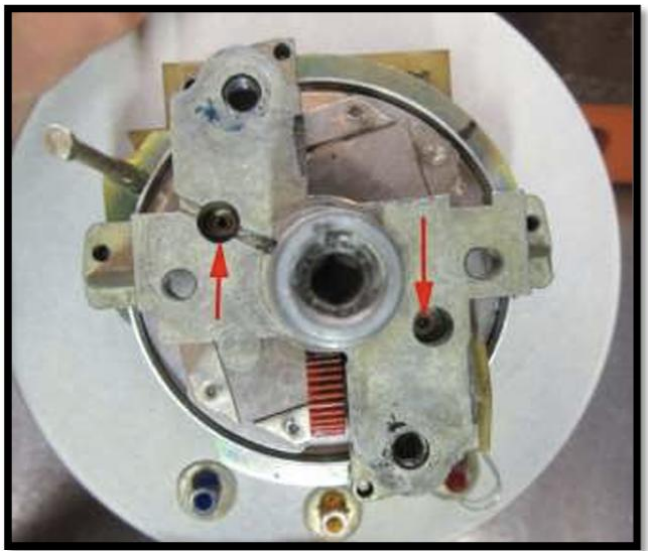
6) Gently turn the works upside down while supporting the upper part of the frame and lift the bottom half of the frame free.

View of the underside of the odometer wheel frame, drag cup attached and magnet wheel frame removed. In the center of the drag cup is the thin spindle which fits into the bushing in the center of the magnet wheel.

View of the magnet wheel after removal from the odometer wheel frame. In the center is the brass bushing in which the pointer spindle rides.

7) If not already done, remove the main odometer pawl to allow the parts to be separated.
8) Rest the upper frame and the main odometer wheels out of the way, canted to one side, and upside down. Do not allow it to rest on the spindle where the pointer attaches, otherwise the flat coil return spring may stretch.

NOTE: IT IS ESSENTIAL TO AVOID DAMAGE TO THE RETURN SPRING. WHEN THE SPEEDOMETER IS DISMANTLED THE DRAG CUP AND THE RETURN SPRING ATTACHED TO IT ARE POORLY SUPPORTED. IT IS EASY TO DAMAGE THE SPRING UNLESS THE DRAG CUP IS SUPPORTED AT ALL TIMES.
9) Earlier speedometers have two screws holding the retaining flange of the magnet wheel and the input shaft to the frame. Remove the screws to allow the magnet wheel and shaft to be withdrawn from the frame.
10) Later speedometers are riveted (as on the SII E-type). The rivets (seen at the bottom of the holes in the below photo) may be drilled out and replaced with non-magnetic screws to secure the flange. Avoid protruding heads that may interfere with the magnet wheel.



Cleaning and Lubrication

1) Clean the highly polished input shaft and the bushing in the frame. Use white grease on the end of a toothpick to lubricate. Apply grease in the narrow mid-sections to provide lubrication for the long term.
2) Replace shaft in the frame. Spin the magnet wheel to assure free spinning. Close tolerance of the input shaft as well as the grease do not allow it to spin multiple revolutions without constant pushing. Nevertheless, the resistance to movement should be very small.
3) The speedometer pointer spindle rides in a small bushing in the center of the magnet wheel. Clean with electrical contact cleaner or “Brakleen” and lubricate with a drop of light machine oil.

Reassembly

1) Reassemble the lower frame to the odometer frame by rotating the lower frame to the proper position on the upper frame aligning all of the screw holes. Avoid damage to the spindle while refitting the frames.
2) Secure the frames with one screw below the main odometer. If odometer has a separate trip odometer, it may be installed now. Refit the other three screws when it is in place.
3) Install the return spring on the pawl using forceps to grip.
4) Replace the speedometer face.
5) Align and install the pointer to the proper location based on the mark made in Disassembly Step 1.
6) As they say, the remainder of the Reassembly is the reverse of Disassembly and Removal.