1963 - 1967 Corvette: Service Bulletin: Fuel Gauge System Diagnosis

Subject: Fuel Gauge System Diagnosis
Model and Year: 1967 Corvette
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TO: ALL CHEVROLET DEALERS

This bulletin is written to define possible fuel gauge system problems and to present a diagnosis procedure for use when a complaint is encountered. Customer complaints may range from general "inaccuracy" to specific complaints such as "always shows empty", "reads 3/4 when full", etc.

Fuel gauge system problems may be divided into 3 major areas:

1. Defective dash and/or tank unit. These include a shorted or open circuited unit or a tank unit with incorrect resistance.
2. Assembly problems leading to shorted or damaged parts. These include wiring shorted by loose screws or cut by sharp sheet meal and loose wire and ground connections causing high resistance.
3. Problems associated with the flat type fuel tank used on Chevelle and Chevrolet, except station wagon. These include erratic readings, wide gauge fluctuations, noise caused by fuel slosh, fill problems due to trim height or driveway slope, and possible tank top interference to full travel of flat arm.

Charted on Page 5, are possible defects in relation to possible customer complaints. A diagnosis procedure is outlined beginning on Page 3.

NON-ELECTRICAL PROBLEMS

The flat fuel tank (as used on Chevrolets and Chevelles, except station wagons) has two main problem areas, both inherent in design to some extent.

There may be complaints of "erratic readings" or "wide gauge fluctuations" as they pertain to the gauge needle movement while accelerating, braking, cornering, etc. This condition is inherent in the flat tank design due to the fuel slosh that is occurring under these conditions. There is no recommended field modification that would alter this condition.

There may be also be general complaints on "Tank reads 3/4 when full". There are several factors

that could be involved with this condition, some of which can be corrected.

a. The basic design is subject to slosh back which causes early shut-off of an automatic pump nozzle. The slope of the station pavement, the length of the pump nozzle and pump rate are other factors involved. Under these conditions, the amount of fill is frequently determined by the attendant's patience.
b. Low rear trim height due either to trunk loadings or to the lower riding height encountered on early production 15-16000 Series Chevrolet vehicles. Spring revisions were effective in production, February 2, 1965, and a bulletin on field correction has been published (DR #739, May 10, 1965).
c. It may be that on some early 15-16000 Series Chevrolet vehicles, the filler neck was inserted too far into the tank. This condition was corrected March 22, 1965, at the assembly plants. The filler neck should extend 7-7/8" (min.), with cap removed, beyond the tank. Field correction is not generally recommended on this unless the condition is extreme as the filler neck angularity is critical in repositioning. This condition doesn't prevent complete filling but does depend on attendant's patience. Correction would involve tank replacement.
d. There are possible conditions at the gauge mounting area or in the tank itself that prevent the float arm reaching full position. Each of the following alone do not affect a problem, but when added may cause an interference condition.

    `. Unit mounting flange on tank bent or at wrong angle.
    `. Unit flange at wrong angle to float arm.
    `. Tank unit rotated slightly out of position during installation, causing float to hit top of tank.
    `. Top of tank concave to extent of interference with float.

On the 1965 Chevrolet Station Wagon tank units, complaints of "never reads less than 1/4" or "tank rattle" may be caused by an interference between the tank unit float and the tank ribs due to an improper mounting flange angle. This problem has been corrected in production and identified by an orange paint mark at the sender mounting area.

When the complaint of erratic or stuck gas gauge on station wagons is encountered, correction can be made by inserting a clean rod approximately 3/8 dia. and 3 ft. long through the filler hole and extending inboard of the suction tube, and bending the tube (not the float arm) outboard till the float is heard to hit the outboard side of the tank. The spring back of the tube, after this operation will approximately center the float in the tank and eliminate interference.

CAUTION: In the above procedure, there is a possibility of breaking the solder joint where the suction tube passes through the mounting plate. If this occurs, or if a new tank sending unit is installed on tanks without the orange paint identification, the replacement sending unit should be reworked per Figure 1 (Page 6) prior to installation.

FUEL GAUGE SYSTEM DIAGNOSIS

Fuel gauge system problems are easily mis-diagnosed and tank or dash gauge units are frequently replaced unnecessarily. For instance, a dash unit be be considered faulty when a poor ground is actually causing the malfunction. During gauge replacement, the poor ground path is corrected through normal service procedures and a good dash unit is inadvertently scrapped.

I. Determine the customer's exact complaint. It may be that his problem is normal with this flat tank design and there is no field correction or modification to alter the condition. (i.e. - tank fill).

II. If there is a deficiency, determine which unit is at fault by either of two isolation methods.

Method a)

1. Disconnect the body harness connector and turn ignition to "on". The dash gauge should read above full mark.

2. Remove the tail lamp fuse (15) amp), then ground the lead from the dash gauge at the separated connector. The dash gauge should read less than empty. NOTE: Remove the tail lamp fuse to eliminate the possibility of grounding the hot lead to dome or trunk courtesy lamp.

Method b)

1. Disconnect tank unit lead at the connector in the trunk or at the tank unit.

2. Connect a known good tank unit to the wire from the dash unit and ground the flange of the test unit.

NOTE: The test tank unit must be of the same year as the car. The 1965 unit rheostat resistance is 90 ohms, (stamped on rheostat housing), earlier units are 30 ohms. Using an earlier unit will result in improper replacement of dash units.

3. With ignition switch "on", the test arm should be moved from "full" to "empty" position. If dash unit then works correctly, old tank unit is defective. A gauge whose needle just touches either edge of "full" or "empty" marks on the dial should be considered satisfactory.

4. If the dash unit operates incorrectly, the difficulty is due either to dash unit or to wiring from dash unit to tank unit. Faulty wiring may be checked by connecting tester directly to tank unit terminal on dash unit. If the gauge dash unit then operates correctly, the wiring is either grounded or open.

NOTE: Under no circumstances should a hot lead be connected to the terminal on the dash unit that leads to the tank unit. If the tank unit is connected directly to the battery in any manner, the

tank unit will be burned out because the resistance of the dash unit is being by-passed.

III. After locating the problem unit, check the ground circuit of each before replacing the unit.

a) Dash unit ground - the 1965 Chevrolet uses two stud mounted clips to both ground and retain the instrument cluster. This circuit is sensitive to dimensional variation and may be tested with a jumper wire from each stud to the chassis.

If ground circuit correction is needed, make a ground wire assembly as shown in Figure 2, Page 6. Install as shown in Figure 3, Page 6.

b) Tank unit ground the float arm interference. The tank unit ground lead should have a star washer between the terminal and body location and connection should be clean and tight.

Flat sedan tank units should be checked again after removal, using the removed unit as the test unit in Step II. This will determine if tank interference or unit damage was cause of inaccuracy.